VOLUME LVII NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

MARCH, 1930

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PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

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TO carry out the purposes for which it was founded forty-two years ago the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and has contributed $55,000 to Commander Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society has conducted extensive excavations at Pueblo Bonito, New Mexico, where prehistoric peoples lived in vast communal dwellings before the days of Columbus; it is sponsoring an ornithological survey of Venezuela, and is maintaining an important photographic and botanical expedition in Yunnan Province, China.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $65,000 to enable the Smithsonian Institution to establish a station for five years on Mt. Brukkaros, in Southwest Africa.

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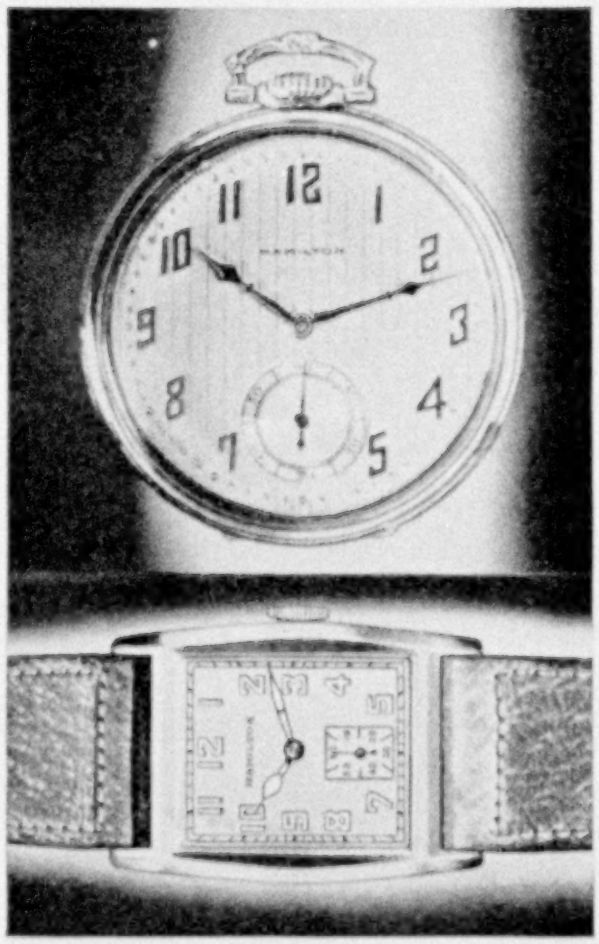

Above—The "Masterpiece", Model C. The dial of sterling silver has raised numerals of solid gold and solid gold hands. In 18k white or green gold with 23 jewels, $250. *Below*—The "Floyd Bennett"—In 14k yellow or white gold, with 19 jewels, $150. Other pocket, strap and wrist models for men and women from $48 to $685.

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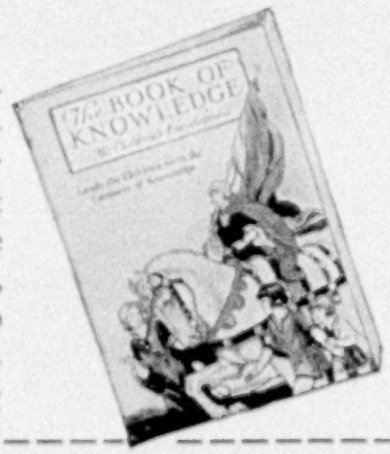

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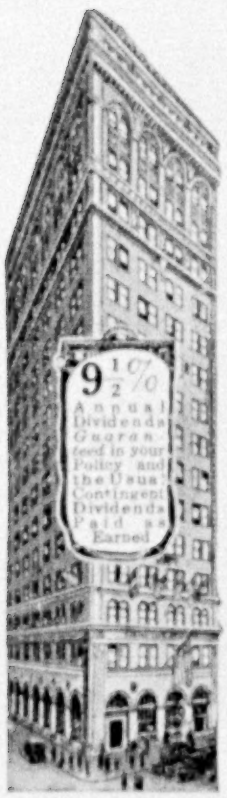

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The Britannia drops Anchor in Boston Harbor

and CHARLES DICKENS Alights

The Old TREMONT HOUSE *where Dickens stayed*

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Concerning the good ship Britannia herself, Dickens had this to say! "There she is! all eyes are turned to where she lies . . . every finger is pointed in the same direction, and murmurs of interest and admiration as 'How beautiful she looks!' 'How trim she is!'—are heard on every side." And he spoke of her officers, "smartly dressed," and of her "huge red funnel, smoking bravely."

Indeed, all America shared Dickens' enthusiasm at the first of all the *steam* ships to establish regular passenger and shipping contact with Europe.

Samuel Cunard had made history. It was Ezra Gannett, man of vision and leader in the rejoicing, who bestowed upon Cunard the sobriquet—" Builder of America."And Gannett flung wide the doors of the old Federal Street Meeting House and to the assembled Bostonians addressed these burning words:

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CUNARD

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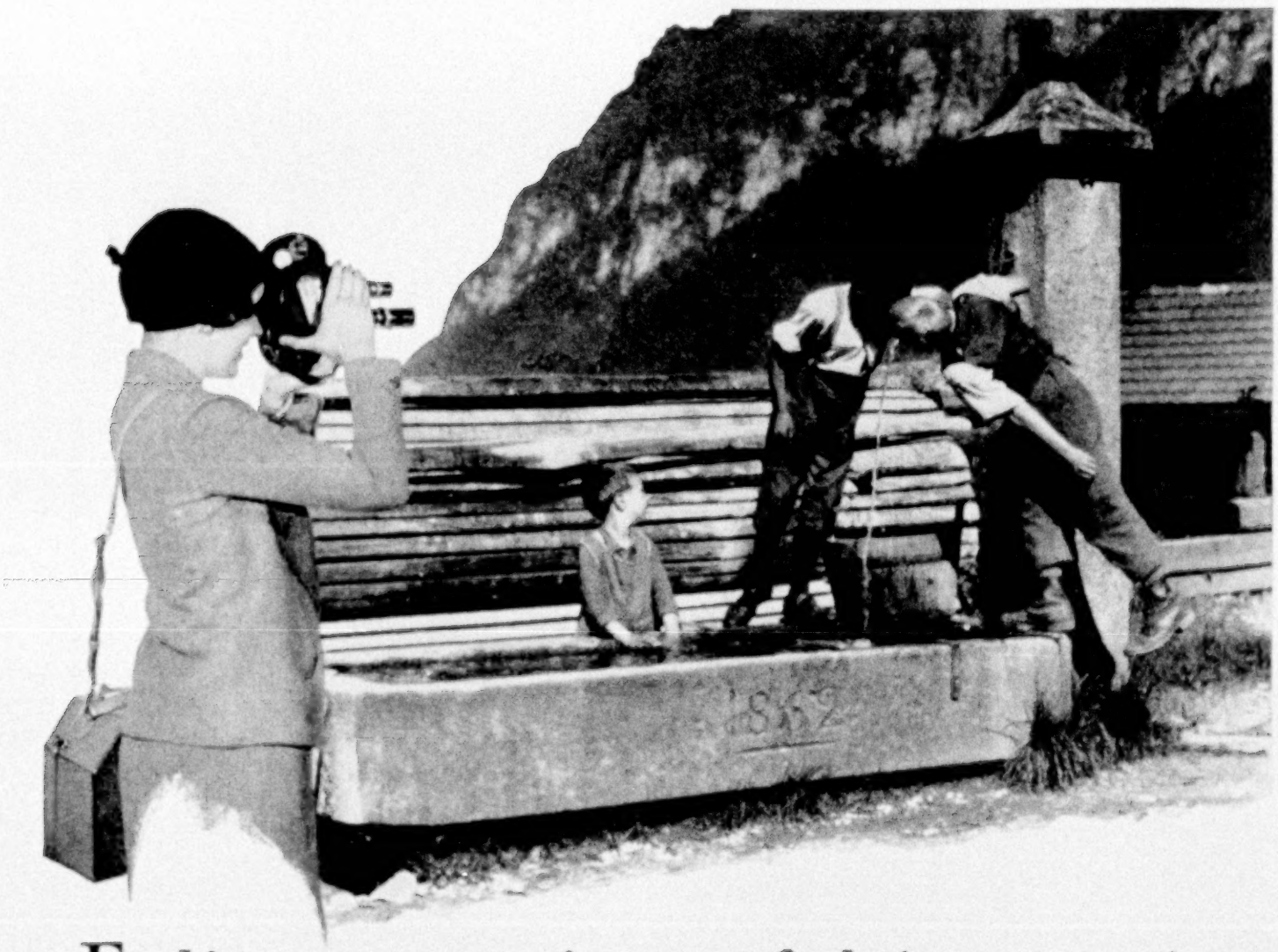

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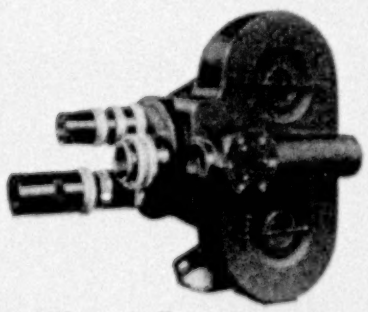

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ANNOUNCES

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More men will achieve independence. More men who might achieve it will fail because of a failure properly to analyze the facts.

A right program will be more profitable than it has ever been. A wrong decision will be far more costly.

To put it in other words, the organization of business, the tempo of business, the speed of business are all in process of rapid change. The evidence is everywhere. In a brief period of thirty days between October 15th and November 15th, 1929, thousands of men who supposed that they were secure for life found themselves suddenly ruined. Thousands had their confidence so shaken that they are dazed and wondering. They have no plan. "What will happen to business in the next few years?" they are asking. "What program should we lay out for ourselves?"

The Institute foresaw the trend

Two years ago the Alexander Hamilton Institute, from its nation-wide contact with business leaders, sensed the tremendous changes which were about to come, and began to make preparations to meet them.

The Institute's original Course and Service in business was a great Course and did a great work. More than 398,000 men made it a part of their business equipment, and are far ahead because they did.

But the Institute saw that revolutionary changes were in prospect. Little business units were being merged into big units. Industries were reaching out into foreign markets. *Security prices were about to become subject to a whole new set of conditions.* Production methods were being revolutionized. The sales organization and strategy of the past were entirely unfitted for the new competition. The responsibilities of guiding the new business could not be discharged by men whose training had been in the old.

The Institute said: "We must prepare a wholly new Course to meet the new conditions. We must engage the co-operation of authorities whose business success belongs to the present, and not to the past. They must be the biggest and most successful men of the present—the men who will be the leaders during the coming five years."

Without regard to cost, the Institute went out to enlist the co-operation of the nation's business leaders. The response was even beyond its most sanguine expectations. In effect, these men said:

"The greatest need of all is for trained leadership. Count on us. Any contribution we can make to this New Executive Training will be a contribution to our own best interests, because it will furnish us with more of the sort of executives we need."

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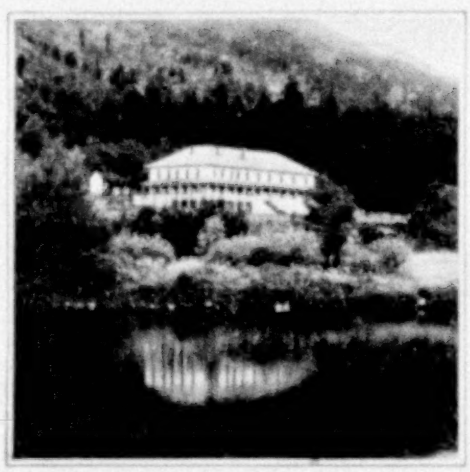

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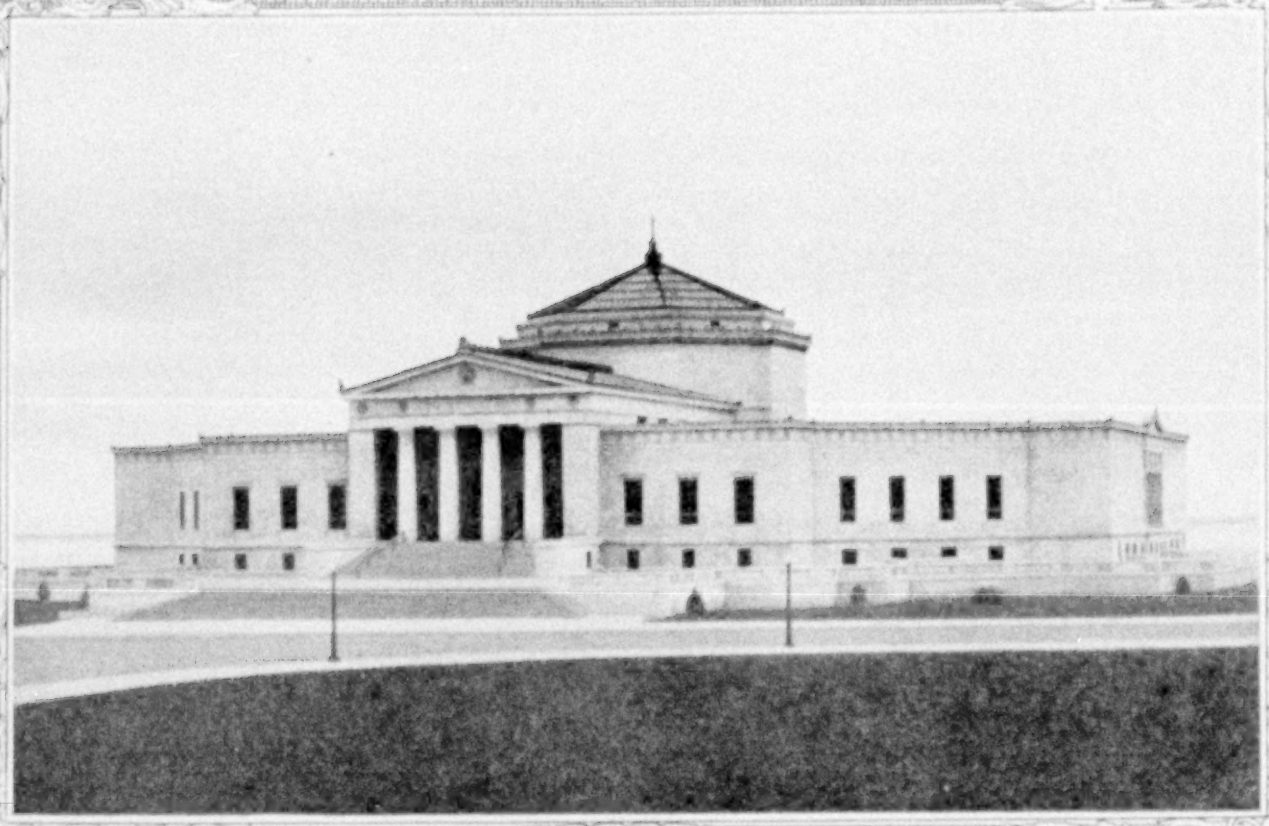

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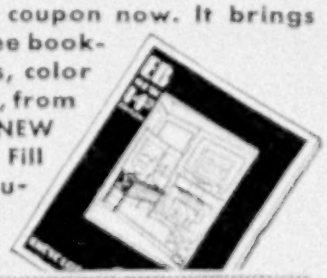

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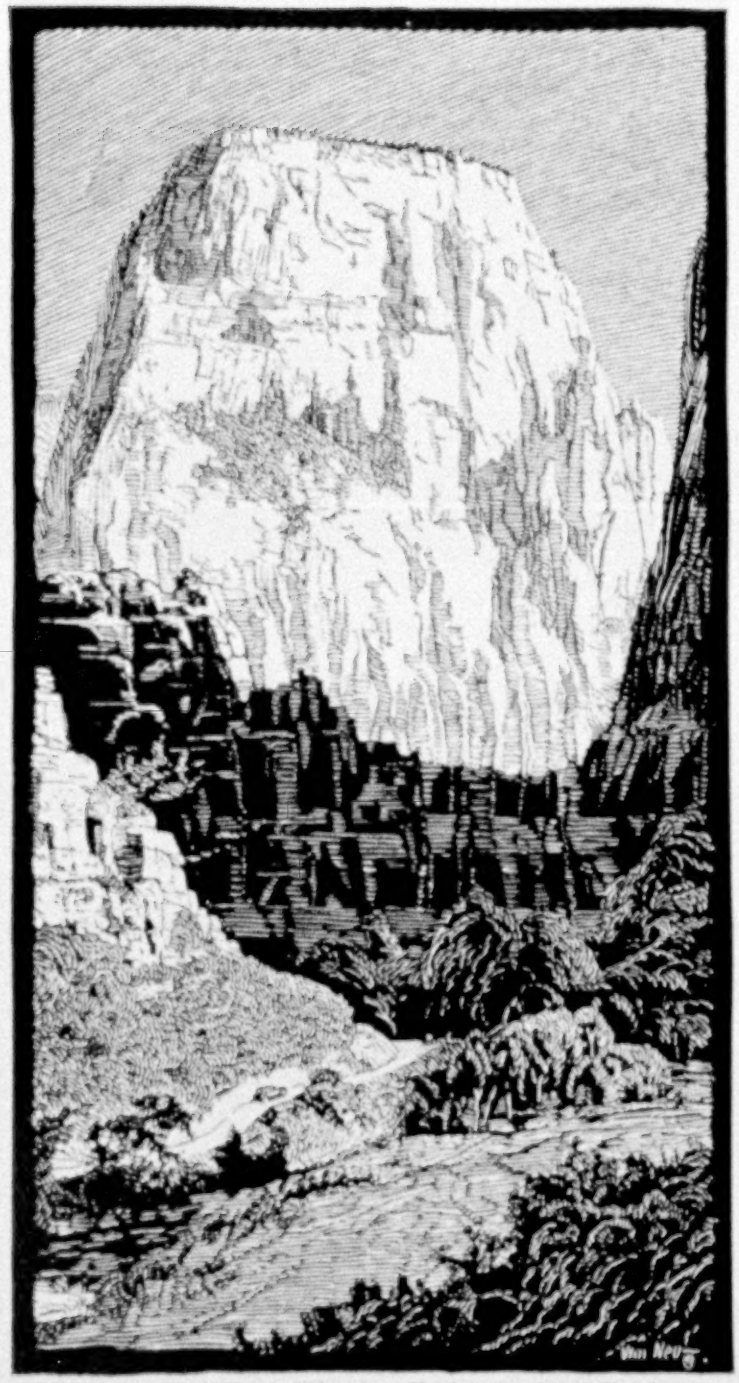

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FIFTY YEARS ago John Davey began experimenting with his new theory that trees could be saved by curative processes. Were they not living things? Were they not subject to disease, injury and other ills? And yet to most men they were just trees, destined to die whenever circumstances took them.

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What gave him the idea no one knows. John Davey passed away suddenly nearly seven years ago without disclosing the source of his inspiration. He did a comparatively rare thing; he gave the world a new idea.

As with most new ideas, John Davey endured the long and bitter struggle against ridicule and cynicism and inertia and established habits of thinking. He struggled forward with remarkable determination and with sublime courage. He lived long enough to see his new science a proven success both from a practical and a commercial standpoint.

Like most geniuses John Davey did not care much for money. He had a profound love of nature and was not only thoroughly trained in horticulture, but was an eager student of the related sciences. He not only gave to the world a new idea, but he gave a fine philosophy also. To him the whole development became a great ideal of usefulness and constructive service. His spirit impressed itself indelibly and is a living force in the organization that he founded and inspired.

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Every Sunday afternoon, 5 to 6 Eastern time; 4 to 5 Central time; over the Red Network National Broadcasting Company. Featuring the old-time songs that everyone knows and loves. Listen to Chandler Goldthwaite on the Skinner Residence Organ.

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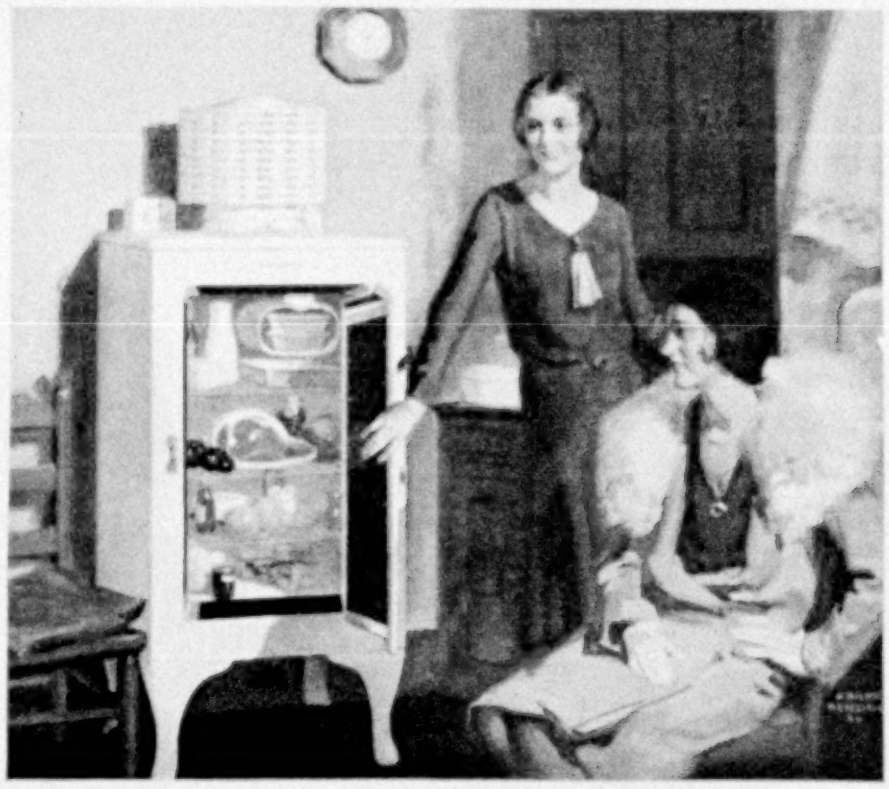

What a lot of claims you hear these days about quiet refrigerators! Almost *any* good refrigerator is quiet—when it is new. But how are you going to pick the one that will *remain* quiet?

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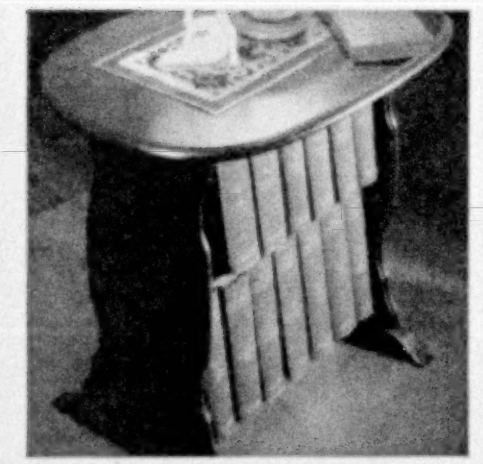

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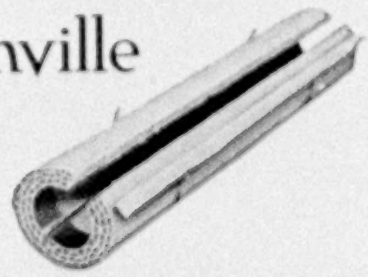

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—before I buy furniture"

"I AM through with being sold furniture. Now I want to buy some.

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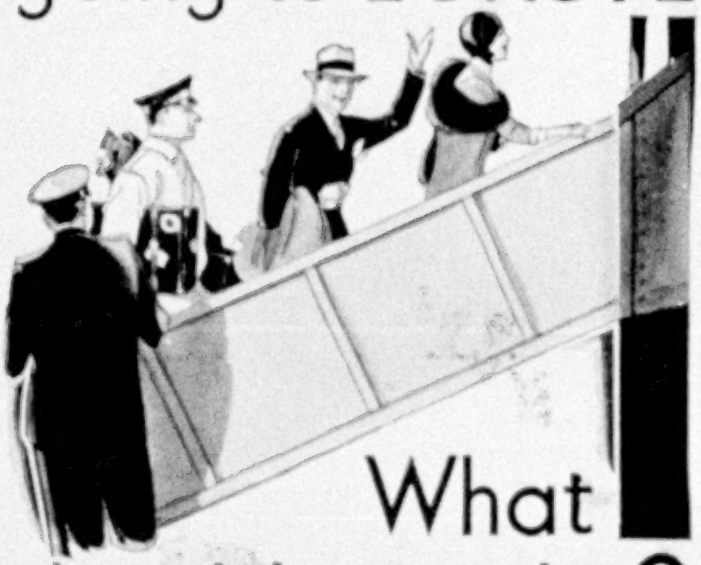
Suppose you are going to EUROPE



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Phil Baker

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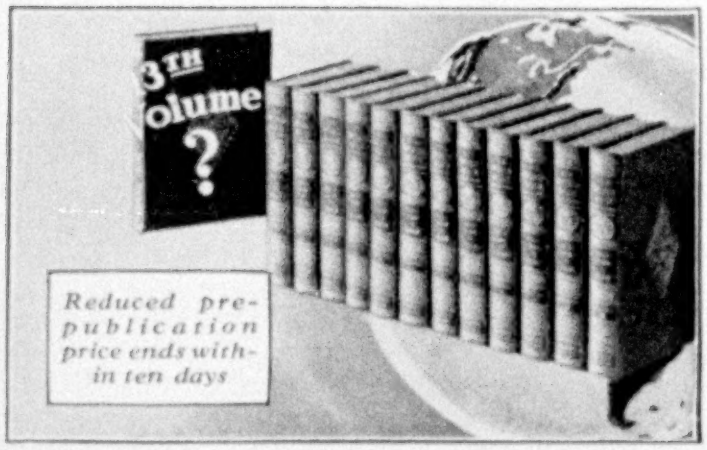

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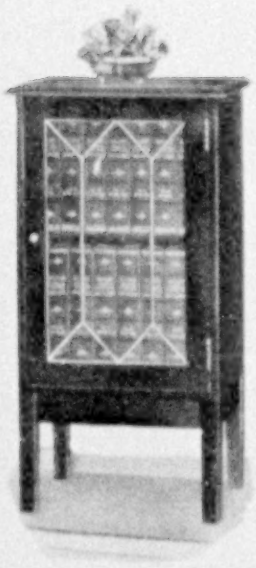

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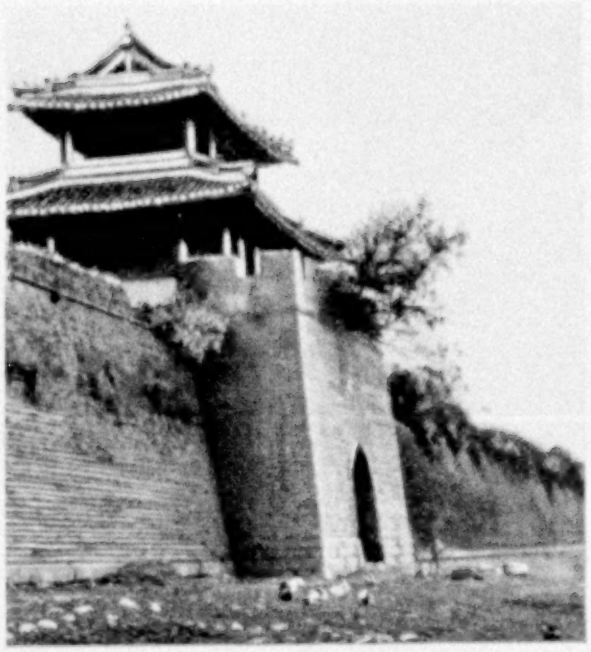

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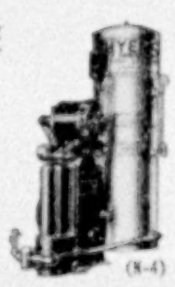

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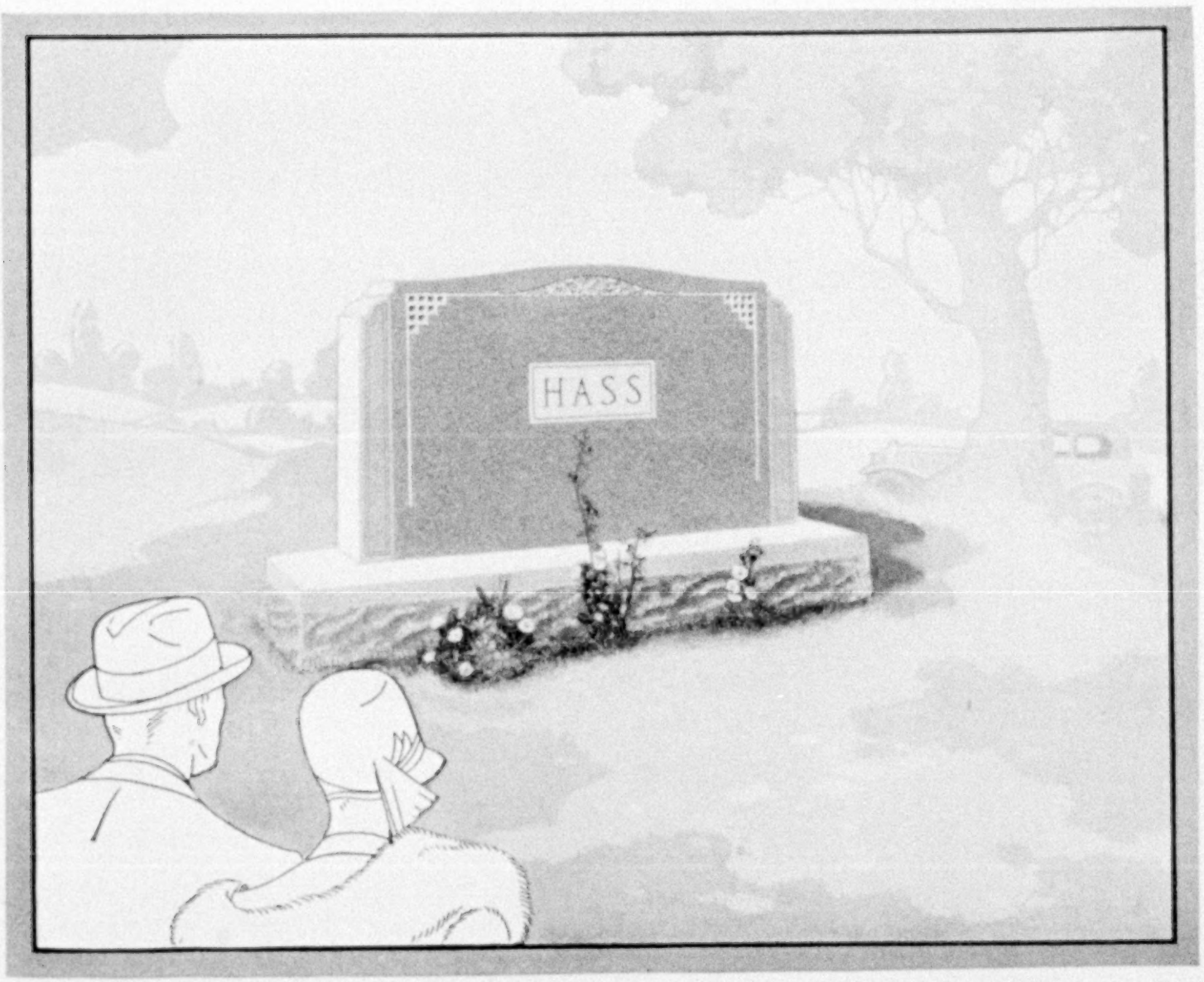

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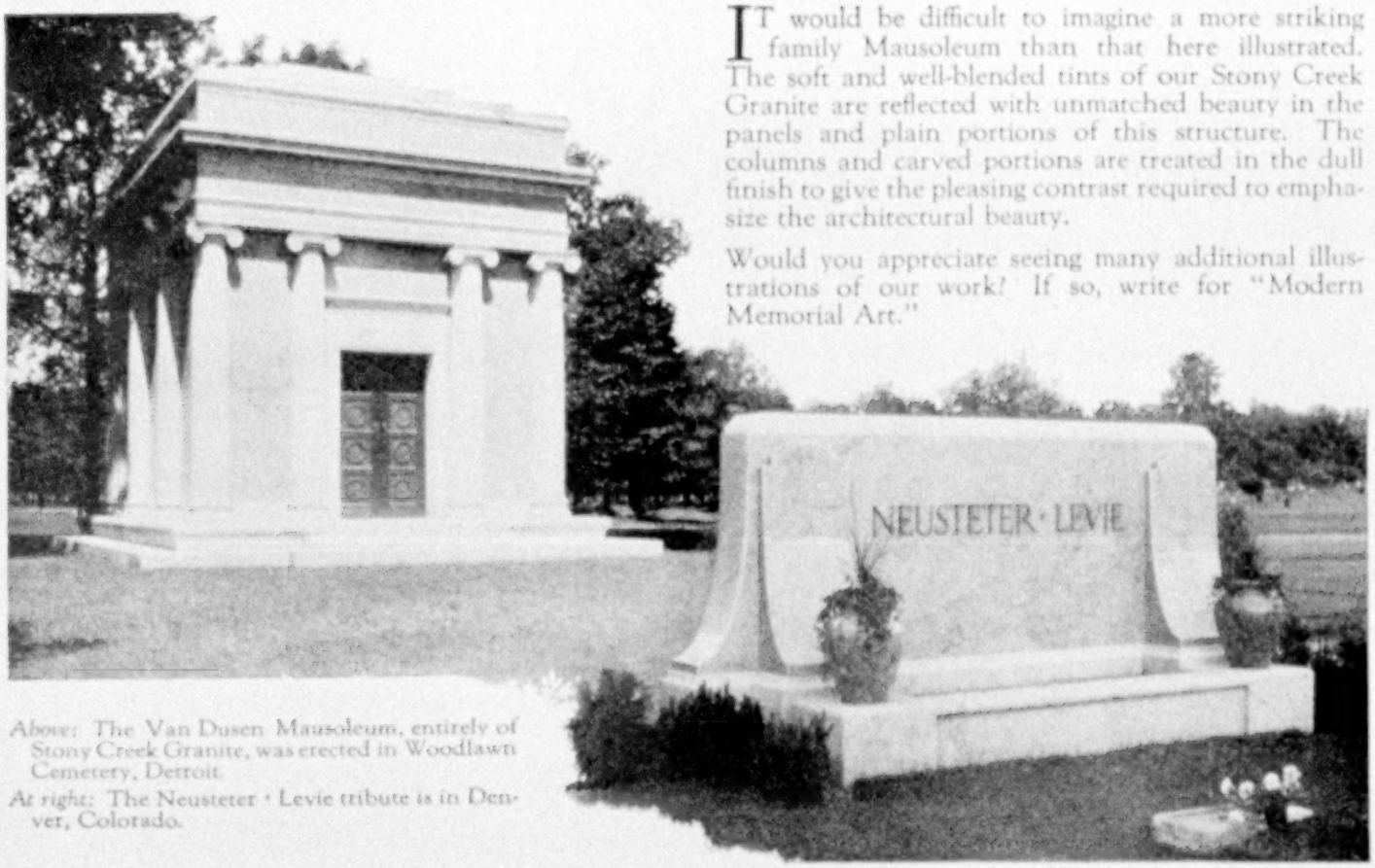

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Have you ever experienced the peace of mind and satisfaction that result from an intelligent budgeting of your income? With necessities provided for and a little money left over you have a far better chance to get ahead.

Send for booklet entitled, "Let Budget Help", which was written with a full understanding of the problems of those with limited incomes. Use coupon above.

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VOL. LVII, No. 3 WASHINGTON MARCH, 1930

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FLYING THE WORLD'S LONGEST AIR-MAIL ROUTE

From Montevideo, Uruguay, Over the Andes, Up the Pacific Coast, Across Central America and the Caribbean to Miami, Florida, in 67 Thrilling Flying Hours

By Junius B. Wood

Author of "Seeing America from the 'Shenandoah,'" "Russia of the Hour," "St. Malo, Ancient City of Corsairs," etc., etc., in the National Geographic Magazine

MERELY a wave of the hand by the field superintendent, the pilot gave the big plane the gun, and we were off. It all was so casual and matter of fact, starting a flight by air which would cover between 7,000 and 9,000 miles, an arc between continents, from budding springtime in South America, across the balmy Tropics to another half of the hemisphere, where autumn frosts are tinting the leaves in North America. The United States post office makes it possible every week; eventually it will be three times a week.

EARTH AND WATER UNROLL LIKE A REEL

History tells of the days, not so long ago as history goes, when a ship outfitted for a year to make a voyage like that, and even to-day some bustle and plan for nearly as long. But this is as nonchalant as it is quick—grab a suitcase, step into the plane, a curt signal to start, a second more and into the air, and only a few days later the voyage finished in another clime.

Those hardy explorers, acclaimed as history's heroes, came back with thrilling stories of cities they had seen, strange people and stranger civilizations, great rivers discovered, mountains climbed, secrets wrested from Nature, all by weary months of plodding over the earth's surface.

In this age earth and water unroll like a reel below, a reel which can stretch a thousand miles in a day, over peaks so high that they have never been climbed, mines and rivers, turbulent seas and fever-ridden jungles, thriving cities and fertile plains, secrets of man and Nature glimpsed by a bird on the wing.

A cold drizzle, last defy of waning winter, had been falling for two days, and Gral. Pacheco Field, outside of Buenos Aires, was a soggy plain of puddles and dripping grass when we took off, on the morning of October 19, 1929. Only an optimist with the sunniest of souls or an air-mail pilot would soar into the threatening clouds on such a day. But a plane travels far and fast, and, cheering thought, to-night, on the other side of the continent, along the Pacific, the sun will be shining.

And that was about all of sunshine! Rain at the start, rain at the finish, and

MONTEVIDEO HAS AT POCITOS ONE OF THE FINEST BEACHES IN SOUTH AMERICA

Ocean bathers at the Uruguay capital revel on a smooth stretch of sand that extends for miles. When Maj. Herbert A. Dargue was here, on his epic flight around Latin America (see "How Latin America Looks from the Air," by Maj. Herbert A. Dargue, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1927), one of his planes was disabled and drifted toward some rocks offshore. Scores of spectators went to the rescue, plunging into the water to pull on a long rope attached to the imperiled amphibian. Montevideo is at present the Southern Hemisphere terminus of the air-mail route between the two Americas.

rain in between—springtime showers and tropical cloud-bursts—the heavens wept along 8,000 miles, for it was the rainy season.

A CURTAIN-RAISER FOR THE REAL FLIGHT

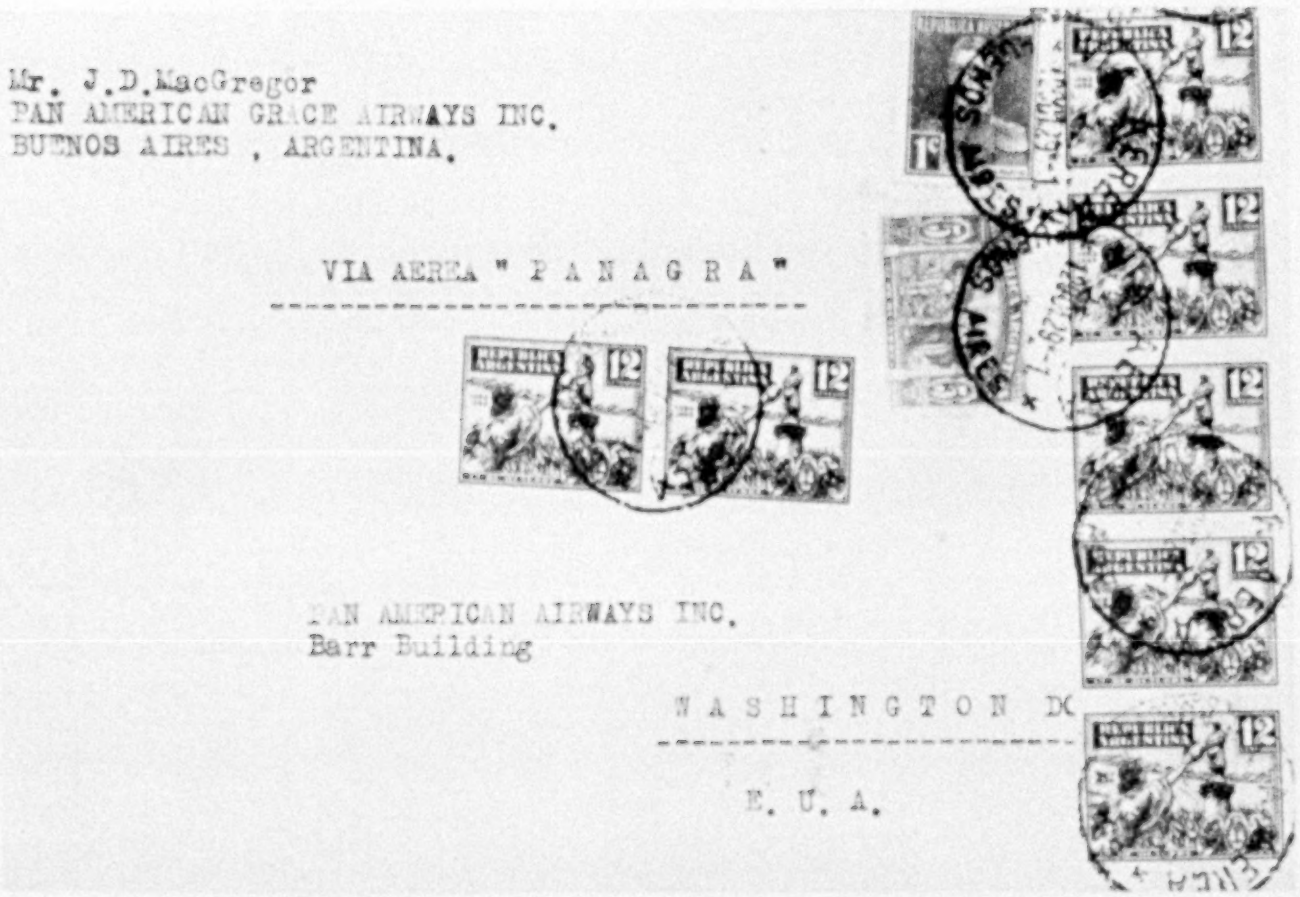
It had rained the day before, when I flew across from Montevideo to Buenos Aires. That was a curtain-raiser for the real flight, crossing the broad mouth of the Rio de la Plata, 120 miles wide between the two cities. Between showers the plane took off from Montevideo, straight across the bay, a tower gleaming like a beacon over the city behind and ships in the harbor dropping below—bizarre oval white decks on a background of muddy-brown river.

We turned the corner around Villa del Cerro, whose old fort once guarded the mouth of the bay and protected the city on the opposite side. This is now a park, and the ponderous muzzle-loading guns of the Triple Alliance of 65 years ago, when Uruguay, Argentina, and Brazil were united against Paraguay, look down on winding roads and peaceful sight-seers.

The little hill was a sentinel 200 years before Montevideo was more than a stretch of sandy beach, for it was what Díaz de Solís and Magellan first sighted four centuries ago (the latter dubbed it a mountain), and sailed up the broad river believing they had at last found the strait which would take them across the continent to the Pacific and on to the riches of India.

Straight ahead, still below the horizon, was Buenos Aires, the skies above glowing red in the setting sun. Between was a wall of black, another storm rushing on to meet the speeding plane, blotting out sun and sky, as it spread over the river.

The plane swung past the plant of one of the Chicago meat packers, big buildings like little white cubes, and followed along the Uruguayan shore. It tossed and



IT RODE THE WINDS FOR 9,000 MILES ON THE TRAIL-BLAZING FLIGHT

A part of the first air dispatch from Buenos Aires, this communication came to Washington for 90 *centavos*, about 37 cents. Argentina does not fix a minimum rate on 10 grams or on a half ounce, as do other countries, but collects air-mail postage on the exact weight of each letter.

bumped as a wing of the cloud-burst caught it. A coating of water covered the windows and the big drops spattered and broke on the wings, fringing them with flying spray.

Then a few minutes of sunshine, then a heavier storm, and Colonia, another city with massive Portuguese ruins, could be seen through the rain. The plane made a sharp turn and cut across the narrowing river. Fifteen minutes later it was circling off the Yacht Club, ships and harbor seeming to tilt eerily as it banked at 45 degrees and cut the surface with a wake of foam.

We climbed out through the trapdoor in the roof into the rain. All night it rained, and when the night porter pounded on my door and in mixed Spanish and German mumbled, "Fünf Uhr, señor!" the graveled walks and flower beds of Plaza de Mayo were dripping under a reluctant dawn.

A taxicab to the railroad station and then a train to Morón—such a name for an aviation terminal—and another automobile jolting and slithering for half an hour over a muddy road to the field.

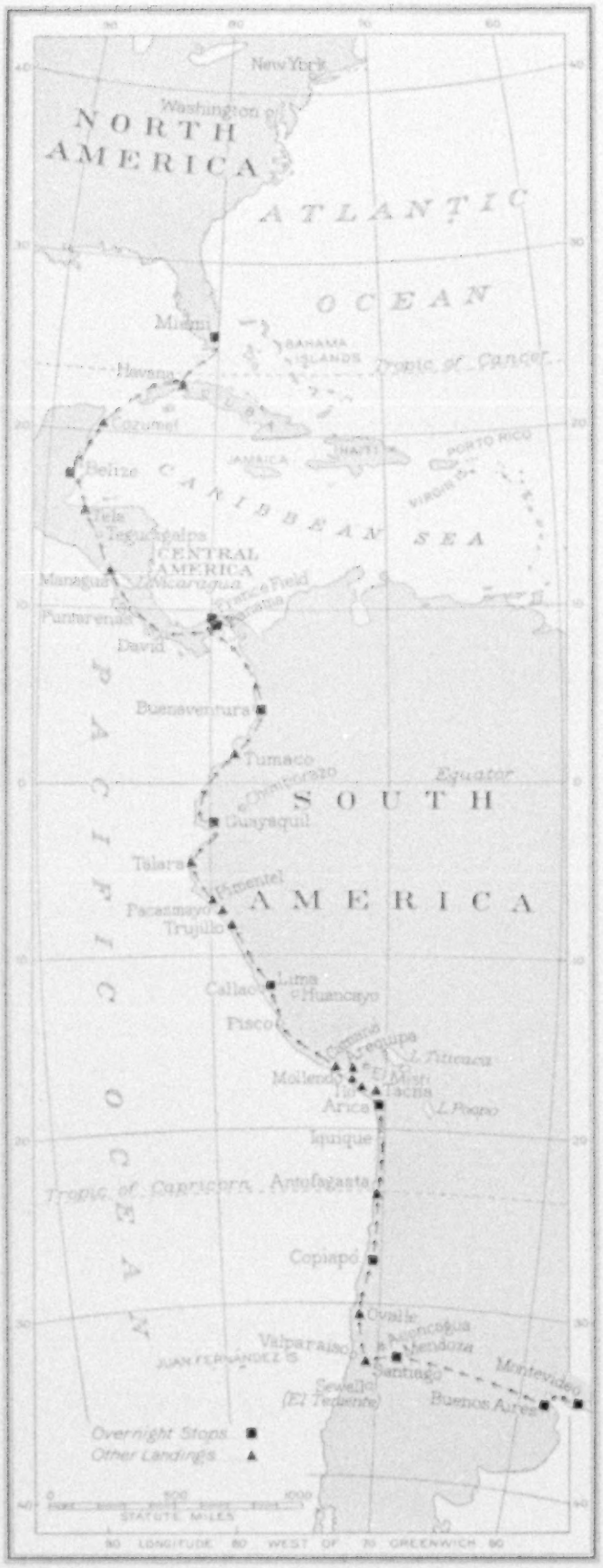
The big, trimotored, metal Ford loomed large at the side of a little shed. Its 75 feet of wingspread was the only shelter from the drizzle which had increased to a steady downpour, punctuated with bursts of lightning. Boots were soggy and high-heeled slippers sank ankle deep in mud.

"NEVER MIND THE LIGHTNING!"

"How about the lightning?" was my only contribution to the bustle of preparations, officials signing papers, mailmen and policemen counting neat little canvas bags, mechanics untying raincoats from shafts, and the pilot warming up the motors. My companion was a former pilot, now a vice-president, and very busy, also wet and without his warming morning coffee.

"Never mind the lightning; let's get off; no danger then," he snapped.

Once before I'd heard something like that. It was in Soviet Russia, one moon-



Drawn by James M. Darley

THE LONGEST AIR-MAIL ROUTE

The author started from Montevideo, Uruguay, at 4 p. m., on Friday, and landed at Miami, Florida, the following Monday week, at 3:55 p. m.—an elapsed time of nine days, 23 hours, and 55 minutes. The flying time was 66 hours and 50 minutes. Eight planes were used on the flight—three amphibians and five land planes. Pilots and crews (copilots, mechanics, radio operators) were changed eight times.

light night, around 10 o'clock, when the entire village was out to assist in my start across the snow behind a reindeer team. "How about the wolves?" I suddenly inquired. "Never mind the wolves," the schoolmaster answered. When you meet one, just give it a cold stare, I suppose. He also was staying home.

The pilot waved, and I dashed through the rain and blast from the motor into the open cabin door. The vice-president walked out abreast the tip of one wing, watch in one hand, the other raised. His hand dropped—8 o'clock—the motors jumped to a roar, yellow waves splashed over the windows, as the 13,500-pound "bird" dashed over the muddy field, a short and quick take-off, and with a crash of thunder and jagged flash of lightning we left the ground.

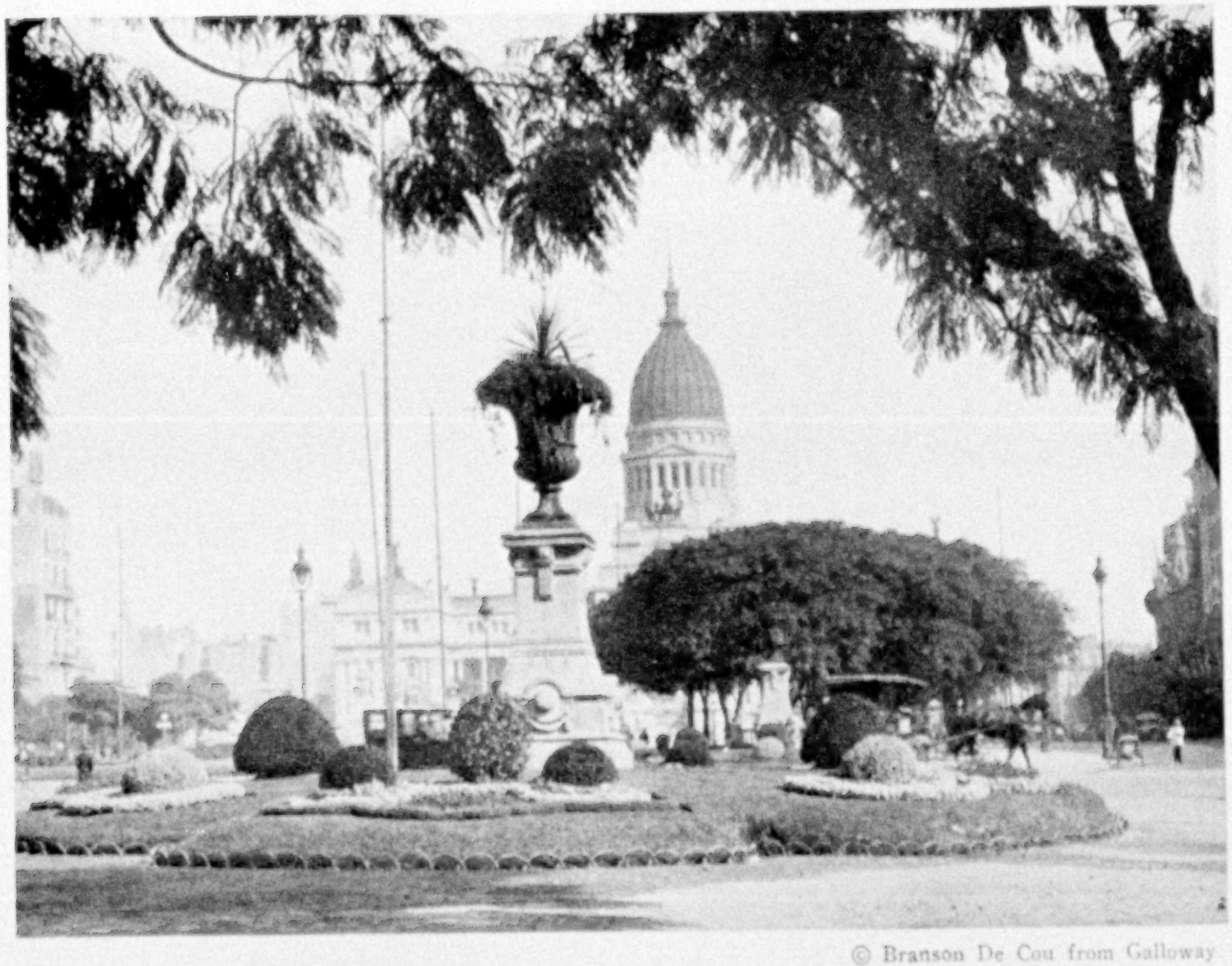
Sparks played from the ends of the metal wings. The vice-president was right; enough electricity was going harmlessly to waste to light a fair-sized town. The explanation is that, without a ground connection, only a direct bolt will destroy a plane. Chances of hitting one head-on seem small.

CLOUDS ABOVE, BELOW, AND AROUND

What looked from the ground like a low hanging ceiling of dripping clouds separated into layers as the plane climbed. The first was of big, irregular patches, between which the water-soaked land could be seen 1,000 feet below, square brown and black fields, acres of timber and pasture, narrow roads like threads, little houses in barnyard ponds of mud and herds of cattle as small as wriggling water bugs.

Upward through the second layer of clouds, and a solid curtain of white stretched beneath us. A couple of hundred feet above was another, but the pilot did not risk going higher. He might not find a hole when he wanted to start down again, but reach the ground quicker than he expected. Clouds above, clouds below, and rain on all sides, the scenery was *nil* and I went to sleep.

This morning, flying low, the air was free of pockets and bumps. The plane took a couple of zigzags and found the railroad. Laboulaye was the sign on the first



© Branson De Cou from Galloway

PLAZA DEL CONGRESO ADDS CHARM TO THE GRACEFUL ARGENTINE CAPITOL

One of the most attractive spots in Buenos Aires is this formal park before the magnificent State building, which is modeled somewhat after that at Washington, D. C. With its more than 2,000,000 population, untold wealth, and magically growing commerce, the city is one of the truly splendid capitals of the world.

station passed, some 300 miles from Buenos Aires. The drizzle had started again and the curious, attracted by the hum in the skies, did not venture beyond open doors. Rarely one would wave, for the Argentine is not at home to strangers, even to those who flit by in airplanes.

ARGENTINA IS A LAND OF WINDMILLS

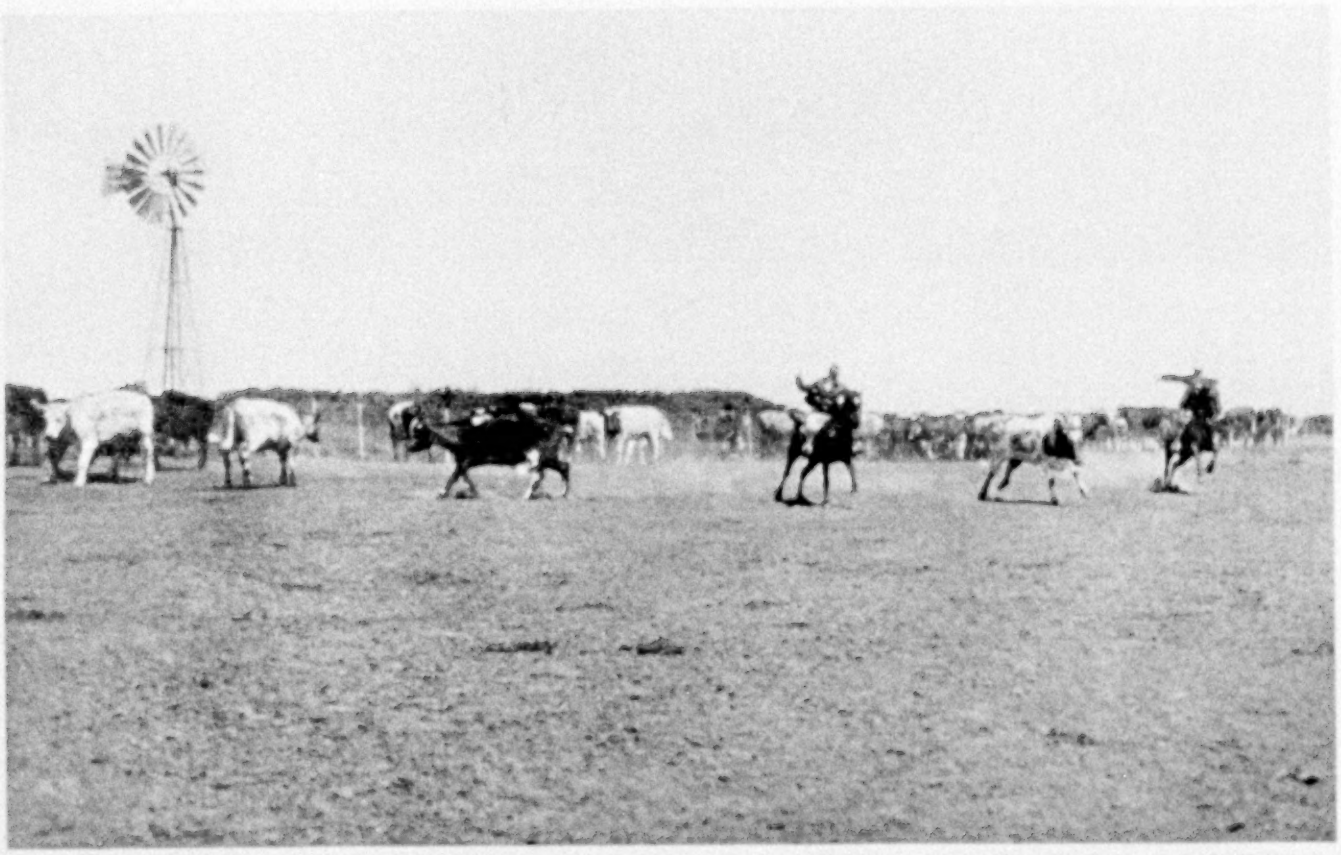
"We'll follow the railroad; it hasn't any windmills," said the pilot, and not two seconds later he went up another hundred feet to clear a water tank which had one. Argentina is a land of windmills. One stuck up through the haze at every *estancia*. The railroad, uncurving over the pampas, also showed our route.

The foothills of the Andes had been reached and we were slowly climbing an hour later. The cultivated fields, pastures, and estancias, in their groves of trees, with straight roads stretching away until they dipped over the horizon, changed into miles of pampas, with scattered brush suggesting Arizona, and an occasional bare ridge of rocks.

The altimeter registered 3,000 feet, but we were only a few hundred from the ground and ears were feeling clogged. A signboard said José Nestor Lencinas (Las Catitas)—conductors must be grateful they do not call it for many trains—and the square fields of sprouting grain had started again, with tree-lined roads cutting them into an unending checkerboard.

Mendoza, 2,500 feet above sea level, was only twenty minutes farther. The city is proud of Tamarindos Field, between 200 and 250 acres, and three civilian aviation companies are preparing to use it and start services with other distant cities of Argentina.

We had made the flight in 5¾ hours, compared to 20½ hours required by the



Photograph by N. O. Winter

EVERYWHERE ON THE PAMPAS THE WINDMILL LIFTS ITS ARMS

These tall steel towers, chiefly manufactured in the United States, add their bit to the hazards of low flying across the great cattle ranches of Argentina (see text, page 265).

Photograph by Capt. Collingwood Ingram

WITH A STICK FOR A GUN, THE GAUCHO (COWBOY) BAGS HIS GAME

The skillful horseman of the Argentine pampas has ridden a partridge to cover, killed it by a sharp blow on the head with his long hunting rod, which resembles a fishing pole, and picked it up by catching its neck in a notch in the butt of the staff. A keen sportsman, giving the bird a run for its life, he has completed the whole performance without dismounting. Like the nomads of Mongolia, the South American cowboy never leaves his saddle if he can avoid doing so.

Photograph by N. O. Winter

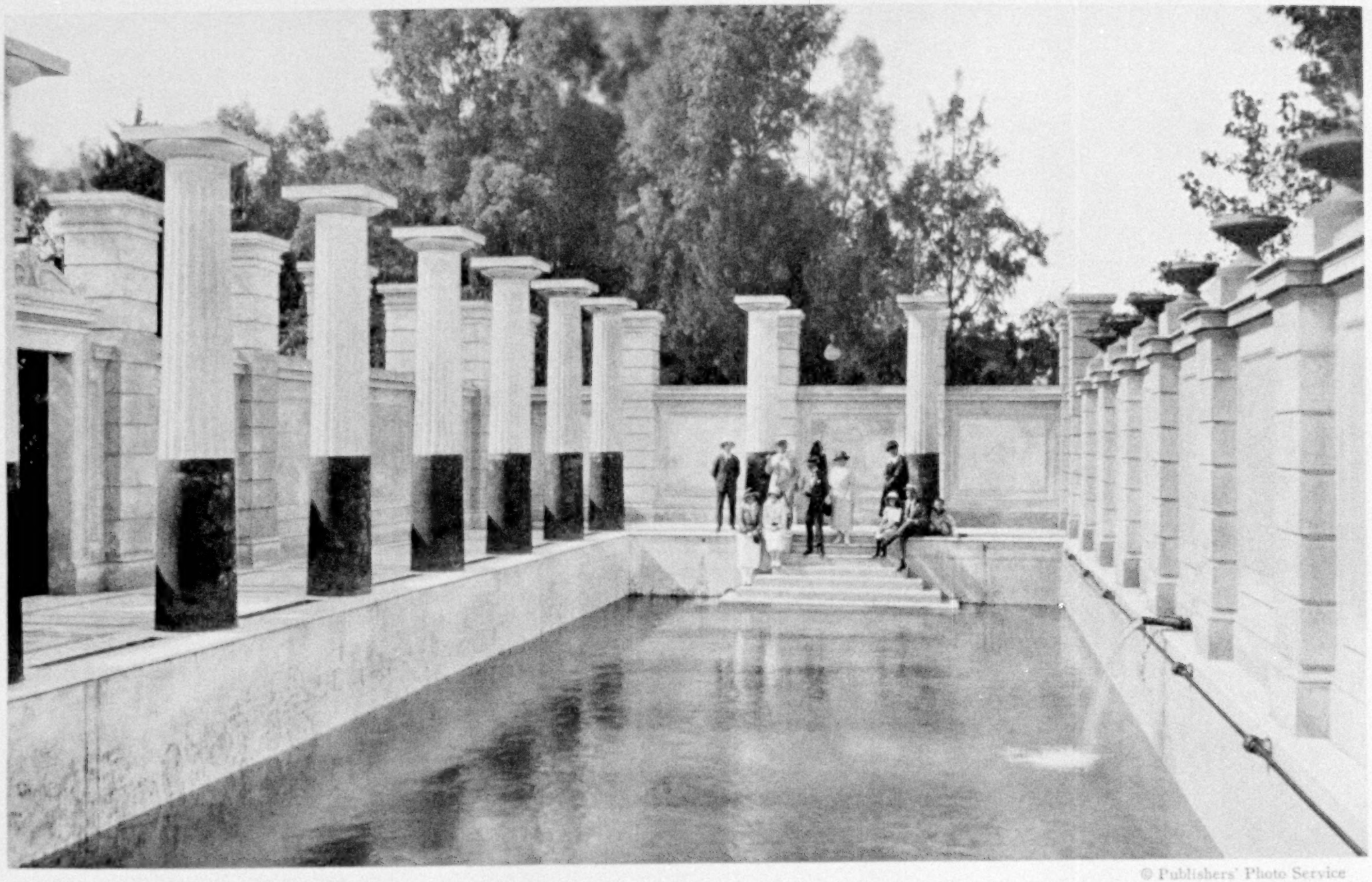
ROPING AN UNRULY BULL ON THE ARGENTINE PAMPAS

Wearing sombreros and leggings and riding with reckless daring, the Gauchos recall the "bronco busters" of the old Wild West of the United States.

Photograph by Capt. Collingwood Ingram

EVEN THE GUANACO OF THE PAMPAS SUBMITS TO THE GAUCHO RIDER

This wild creature of the camel family has been captured on the open plains by means of the *bolcadora*, a throwing device consisting of three thongs bound together at one end and attached at the loose extremities to leather-covered weights, two round and about the size of billiard balls, the third slightly elongated for use as a handle. The user, going full tilt on horseback, whirls the instrument about his head and flings it at his fleeing quarry in such a manner as to entangle its legs and bring it to earth.



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AT A GREAT ESTANCIA, COUNTRY LIFE IN ARGENTINA KNOWS NO HARDSHIPS

Costly refinements, such as this magnificent swimming pool on a ranch near Buenos Aires, are not unusual on Argentine estates. Wealthy landholders often live in regal splendor on domains of vast extent.

Photograph by Jacob Gayer

ON A SPLENDID ONE-MILE TRACK, RACES ARE RUN EVERY DAY DURING THE SEASON AT VIÑA DEL MAR, THE NEWPORT OF CHILE

In January, February, and March wealthy Chileans go to the coast to escape the hot weather. This resort city, a few miles north of Valparaiso, has hundreds of luxurious villas, clubhouses, golf courses, tennis courts, and football fields.

Photograph by Junius B. Wood

RIDING ALONG THE WORLD'S HIGHEST AIRWAY

Wild and forbidding are the cold peaks of the Andes near Aconcagua, the loftiest mountain of the Western Hemisphere. This view was taken by the author at an altitude of 20,700 feet (see text, pages 277-299).

fastest train. Not so many years ago ox-carts trundled along for weeks over the same trail and Gauchos of exceptional strength, by using relays of horses, made it in seven days.

"Yesterday was a beautiful, clear day and we could see every peak from here," said one of the local air-minded enthusiasts, as the pilot looked toward the cordillera of the Andes, which was yet to be crossed. When rain has soaked the picnic pies or broken up the baseball game, somebody always remembers that the weather was fine yesterday.

LAS CUEVAS FORECASTS AVIATION WEATHER

"What does Las Cuevas say?" the pilot asked.

"Snowing, blowing a gale, and 38 degrees below zero," the local agent for the aviation company replied.

"The snow would turn to ice on the wings and bring us down. We'll ask them again in an hour."

Photograph by Jacob Gayer

SANTIAGO SWIMMERS ENJOY SPORT IN CHARMING SURROUNDINGS

With a delightful climate and some of the loveliest public parks in the world, the Chilean capital offers year-around recreation for lovers of the outdoors. This pool is in the grounds of the Quinta Normal Park.

It was cold, windy, and wet, even on the level of Mendoza. One of the hospitable *Argentinos* found a youngster with a battered but steaming granite-ware pot of coffee and a tin cup, which made the circuit while we waited.

Mendoza, in Argentina, and Santiago, in Chile, are close on the edge of the towering peaks, and Las Cuevas is the highest of the Argentine Transandine railroad stations, 10,250 feet up on the edge of the frontier. It is also an office of an American cable company and its unsung operator there is the weather forecaster, on whose word the aviators who make this daring dash across Nature's wall of a continent pin their fate.

Before they start from either side, a message goes to Las Cuevas. Almost instantly, rarely more than a couple of minutes, the answer is back, for the line is direct. On it depends whether the attempt shall be made. Storms whirl around the peaks and pass along. At that height their approach can be seen with reasonable certainty.

When the operator reports that one shows no sign of breaking, the planes stay on the ground, no matter how much pilots or passengers may fret. When he says

Photograph by Richard B. Hoit

VALPARAISO DOES MORE BUSINESS ON THE PACIFIC THAN ANY OTHER SOUTH AMERICAN PORT

Principal gateway of Chile, this crescent-shaped bay teems with commerce. Though breakwaters and piers have been built, most ocean-going vessels stand far offshore while fleets of lighters carry their cargoes to and from the wharves. The city was benefited greatly by the opening of the Panama Canal. Plans now under way provide for a harbor that will give safe anchorage to 7,000,000 tons of shipping.

Photograph by Alice Schalek

A COPPER MINE, 12,000 FEET ABOVE SEA LEVEL, AT SEWELL, CHILE

American capital has done much toward the development of mining properties in Chile, of which this great project, about 200 miles southeast of Valparaiso, and the extensive iron fields near Coquimbo are among the most important.

Photograph by Jacob Gayer

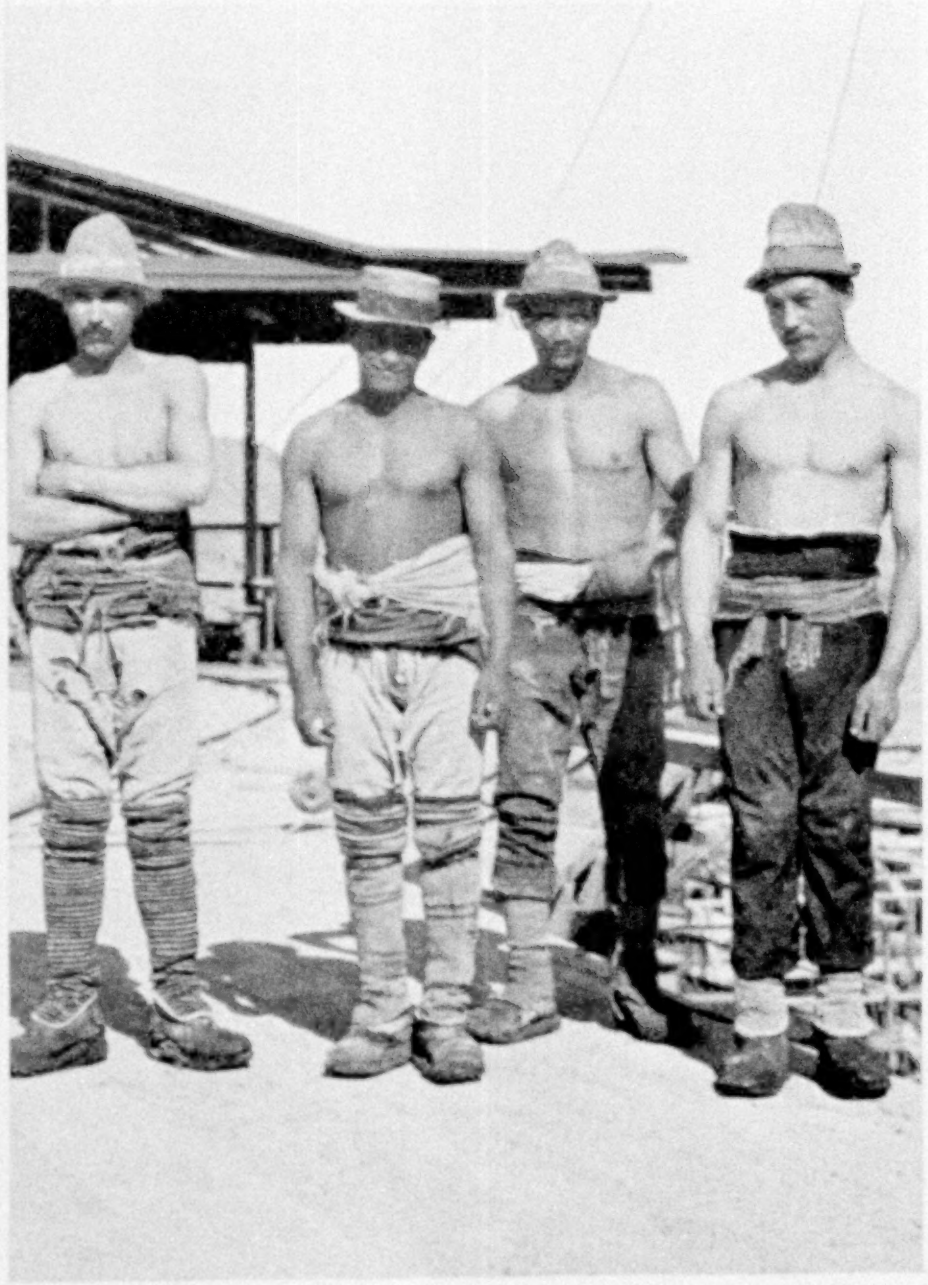
OCEAN BATHING AT BALNEARIO RECREO INVIGORATES ITS DEVOTEES

The cold Humboldt Current, which tempers the climate along the coast of northern Chile, does not afford ideal swimming save for the hardier lovers of the sport. This beach near Valparaiso is one of the most popular.

Photograph by Jacob Gayer

WOMEN COLLECT AND RECEIPT FOR FARES ON VALPARAISO STREET CARS

Drafted into service at the time of the war with Peru, when the men went north to fight, these feminine conductors proved so satisfactory that they have held their jobs ever since.



Photograph by Richard B. Hoit

ONLY THE HARDIEST CAN ENDURE THE TOIL IN THE NITRATE PLANTS

After the commercial fertilizer has been leached out of the *caliche*, as the product blasted from the ground is called, these men dig out the boiling tanks of waste material.

Photograph by Jacob Gayer

WATER "TAXIS" SOLICIT PATRONAGE AT COQUIMBO

At this important Chilean port, outlet for extensive iron and other valuable mineral deposits, ocean-going vessels must anchor at some distance offshore. Native passenger carriers do a thriving business with little boats built like canoes, pointed at bow and stern, to facilitate their navigation in rough weather.

that it is passing or that the sun is shining, they take off. It has its risk. Sometimes a storm comes which was not expected, and the flyers are forced to turn back. Sometimes a pilot may not be able to turn back, and the ice-burdened wings will crash and stay on one of those peaks which nobody has climbed. It is a gamble, none better, for crossing the Andes has thrills all its own.

SNOW IS THE ENEMY OF THE MAIL PLANES

Wind and cold do not stop the planes, or the towering mountains would never be crossed. They are always there. Snow is the barrier, and this day the drizzle in Mendoza was a driving blizzard high up in the frozen chasms of Uspallata Pass.

Sunday morning, skies had cleared and the white-capped peaks awaiting us stood out in the west when our automobile reached the field. A gendarme with a rifle, who had guarded plane and mail, was the only sign of life. He shivered, and he had a right to, for the night had been cold and wet. He wished us a pleasant trip.

Waterproofs were untied from the motors, a few minutes for warming up, and we were off. The agent waved a good-

Photograph by Jacob Gayer

WATER PIPED 190 MILES KEEPS ANTOFAGASTA'S PARK GREEN

Strangely enough, in the region which produces the world's greatest supply of the important fertilizer, nitrate of soda, no vegetation will grow without irrigation. Commerce has created a city of more than 50,000 at this arid point on the coast of Chile, bringing down from the high Andes the flow of Siloli Spring to supply all domestic needs.

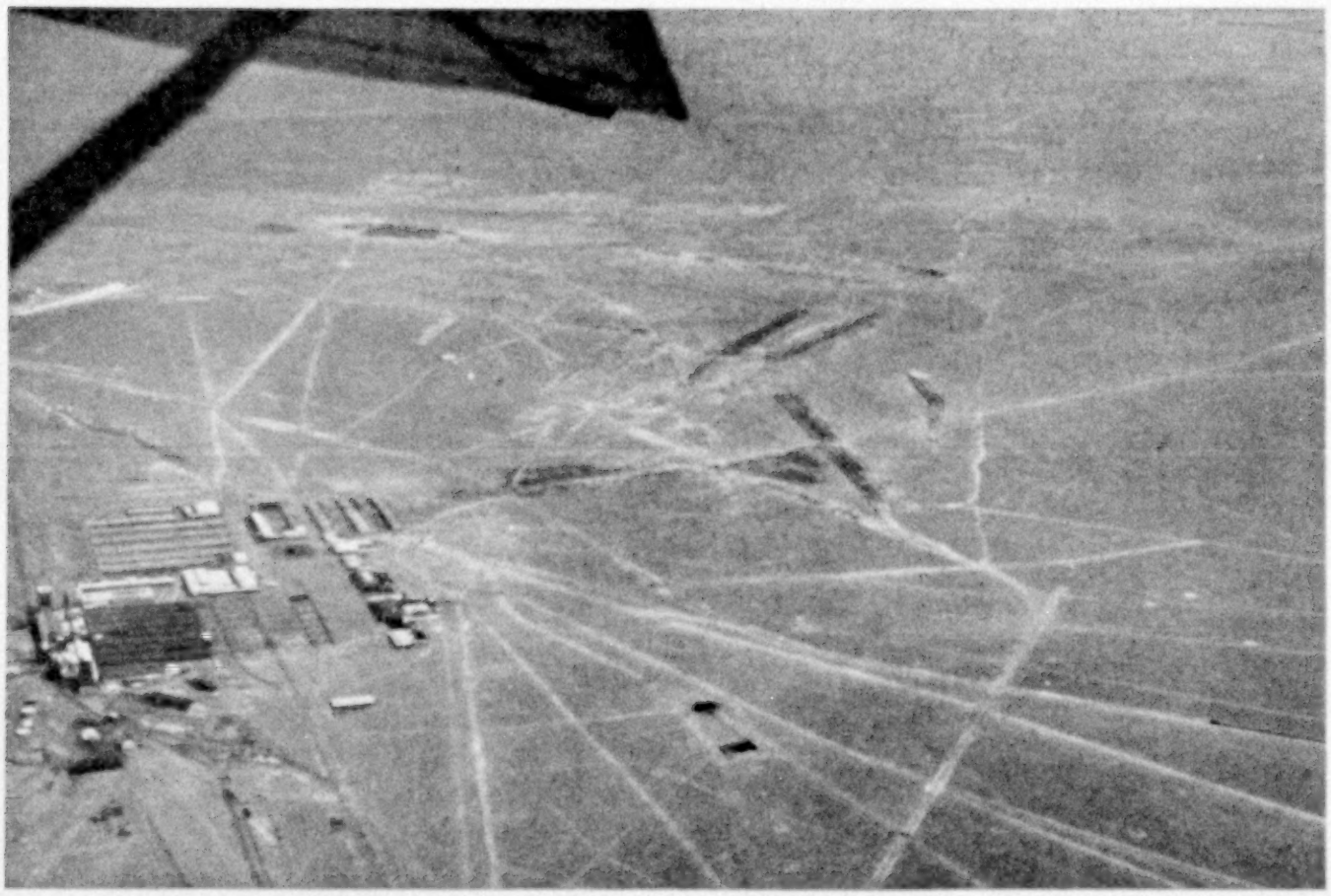
bye and climbed into his car—home for breakfast; not much fuss about getting away in an airplane. Mendoza was already dropping out of sight below.

The plane went steadily upward, at first over cultivated fields, getting farther and farther below, and then over the first ridges of the mountains, which suddenly jumped up as if to catch us, with their cold tops seeming only a few feet below the fat rubber wheels.

The altimeter registered 7,000 feet at 8:20, 9,500 at 8:22—passed the 10,000 and started a second circuit—13,500 at 8:33, 15,000 at 8:43, 20,000 at 9:03—the ceiling for the plane is listed at only 19,000—and 20,500 at 9:10, climbing slower and dropping farther in every pocket of the rarefied air.

The world is far below, under a broken floor of clouds. Aviators always refer to the clouds as a ceiling; but why shouldn't they be a floor, once the plane is above them?

Thoughts are becoming chaotic and rebellious in that brain-drugging altitude. Actually the earth is not so far below, for the jagged, menacing surface has fol-



Photograph by Junius B. Wood

CHILEAN WASTES, BARE AS SAHARA

Salinitas lies in a desert upon which rain never falls, where there is not a tree nor any other green thing—a place of rocks, sand, and salty particles that reflect blindingly the torturing rays of the tropical sun; yet during the World War the value of exports of nitrate of soda from this desolate country was equivalent to $45 for every person in the Chilean Republic.

lowed us as we climbed. Here and there it still is with us, bare white peaks rising above the clouds, as if stretching out to snare invaders of the passage they have held inviolate since the world was formed.

A WORLD OF DREAMS

The clouds stretch white as far as the eye can see—soft, inviting, sparkling in the sun like a floor of cotton—hiding the death beneath. Big black patches show in gaping holes on a frozen sea. The sun strikes through them—all else must be gloom below; we in the bright sunshine, and darkness right beneath us, under that white mantle—painting a panel of mountain side miles high (see page 270).

Peaks of frozen white, which never melt, drop into streaks of black and white; snow in the crevices, and the jutting black faces between, swept bare by the constant gales. The snow-packed gullies change to shiny black, flecked with white; then scrubby trees of pine, which look like bushes, and, so far beneath that it seems the bottom of a pit, a level patch of green or a snow-filled canyon which the sun never reaches.

My head is aching, muscles seem taut; I've a great longing to sleep; that's amusing—sleep while crossing the Andes, the trip of a lifetime; like going to see Niagara Falls and sitting in the hotel reading a magazine, or talking to the girl at the cigar counter—equally stupid.

The brain grows dazed, as if going under ether, but without a girl in white saying, "Keep your thumb moving, mister," or a dentist brandishing a forceps and ready to pounce as soon as eyes close.

The hum of the motors changes to a soothing, far-away refrain, but the eyes see everything—the marvelous scenery, every changing detail of plane and men, the vast, indescribable emptiness—and the brain throbs as under a powerful stimulant, ideas flashing through without relevancy, reason, or coherence. Four miles into the void and one is still alive, but in a world of dreams.

The hand on the altimeter is pushing

Photograph by Jacob Gayer

ANTOFAGASTA NITRATE EXPORTS AMOUNT TO A BILLION POUNDS ANNUALLY

This busy Chilean port is the chief gateway to Bolivia, the treasure vaults of the Andes, and a desert under whose surface are seemingly inexhaustible stores of rich fertilizer. Out of it pass vast quantities of copper, tin, and much of the world's supply of borax.

hard, like one of those old lung-testing machines in a penny arcade—Bill trying to blow a pound more than Sam; neither would register much in this thin air. It touches 20,700; hard climbing, getting harder every minute, as the air gets thinner. This dial has only ten figures on its face, each 1,000 feet. Some have twenty. One with ten is easier to read—great observation! Hand just keeps on going around; it has staggered around twice already. Anybody can tell by his headache whether he's up 10,000 or 20,000 feet; before it went around three times he'd be unconscious or dead. Yes, a ten-figure dial is better than twenty.

The smaller phosphorescent dial of the clock on the other side shows 9:25. Funny clocks in airplanes—only 3, 6, and 9 on their faces. People don't read figures on dials anymore than they spell out the letters in a word. Most persons can't tell whether their wrist watch has Arabic or Roman figures. Wrigley clock, in Chicago, has all II's, and a million people a day tell time by it and never notice. Must be a reason, though. Perhaps too many phosphorous figures would dazzle the pilot's eyes. Let it go at that.

THIRTY-EIGHT BELOW ZERO

Riding along the world's highest highway, that's something for a Sunday morning spin between coffee and dinner, and no traffic blockades; nothing like those boulevards outside every city in the United States on a springtime Sunday. Springtime in the Andes ought to be a song. Thirty-eight below zero, the pilot says; he looks it, out there in front.

Other planes have been higher—not so many at that—but this is a regular highway, very exclusive, for those crowded off the earth's surface. Anyway, we have it all to ourselves, and those cold white peaks sticking out don't extend any hospitable welcome.

Better take some notes about all this; perhaps I can read them when I get down to earth. Been taking notes for 20 years—dopes, dummies, and geniuses; never took any of a dream; sound very foolish when

you wake up. Well, photographs are upside down when they're taken; look all right afterward—sometimes. Nobody knows what a nut took them. Why not notes?

Might be easier if the plane wasn't bumping so; like trying to write a letter in an automobile, only we're dropping hundreds of feet with each bump; then the pilot catches it and we crawl up again. Certainly plenty of wind; that's why we're so high. It's the pilot's worry, not mine. He knows his job or he wouldn't be here, and he's not going to commit suicide. He's just paid his wife's fare to come from the United States. Not my worry. Never be a back-seat driver, either in an oxcart or in an airplane four miles up in the air!

Four miles—not quite; some volunteer auditor will question that—but almost four miles—420 feet less. A normal city block is 660; less than a block to go; but we won't bother about that; we're not making a record; merely delivering the mail. Think about this when you get your letter from Buenos Aires; it had some ride for 37 cents! (See illustration, page 263.)

Up in front the pilot and mechanic, who yesterday showed two red heads and shirt sleeves, are muffled in leather helmets and coats. Their pilot house is inclosed, but it is colder than in the cabin. They are exercising as in a football scrimmage.

"DON'T ROCK THE PLANE!"

The big plane lurches and plunges in every direction, like a ship in a Chinese typhoon. Four hands and feet are not too much for a pilot, as he fights to keep it steady. Even gasoline is sluggish in that Arctic cold; the rarefied air is weak and the mechanic is pumping with both hands. He opens the door of the cockpit and steps gingerly back into the big, lonesome 14-passenger cabin.

"Don't move from your seat!" he shouts into my ear. "The last time you looked out the other side we dropped 1,500 feet."

He yells at the top of his lungs to be heard above the roaring motors. My ears are not stuffed with cotton, but his voice sounds faint. He sneaks an extra minute to shuffle his numb feet gently on one of the hot-air radiators in the floor, just like the radiator in the old tin jitney on the farm—handle kicked off; couldn't close it in summer and couldn't get it open in winter.

"Lordy, it's cold out there!" he starts shouting again. "The pilot's got two pairs of woolen socks on, but he'll be tell'n' again to-night about his toes being frozen. Long's his noodle doesn't freeze, we're all right. This's no place to crash."

With that reassuring statement, he was tiptoeing back. Don't rock the plane. My head is going around like a pinwheel and seems splitting; no enthusiasm for moving, without any warning to sit tight. Must be getting very dopey, for we seem upside down; hope the pilot doesn't get the same idea. We'd give one of those mountains an awful bump; that's what aviators say happens in fogs—think they're going up when they're going down; never get orientated until they smash the side of a mountain; ought to have oxygen tanks for pilots on these planes; let the passengers go into a trance; they've no responsibility except to sit still.

The sliding windows are frozen shut and streaked with frost. Window panes? No, pains; it's a soupy scrawl, but I'll know when I get down to earth, pains or panes; both look natural. What's the difference? A copy-reader can correct it; that's what he's for. Great age we're living in! Columbus came over and wasn't heard from for a year. To-day, misspell a word in Chile and half an hour later a copy-reader is correcting it in New York, 8,000 miles away. Rather expensive, though—50 cents to cable the wrong word—but cheaper than carrying a dictionary at $1 a pound excess baggage. One of those books weighs 15 pounds and might fall out of a window and hit somebody!

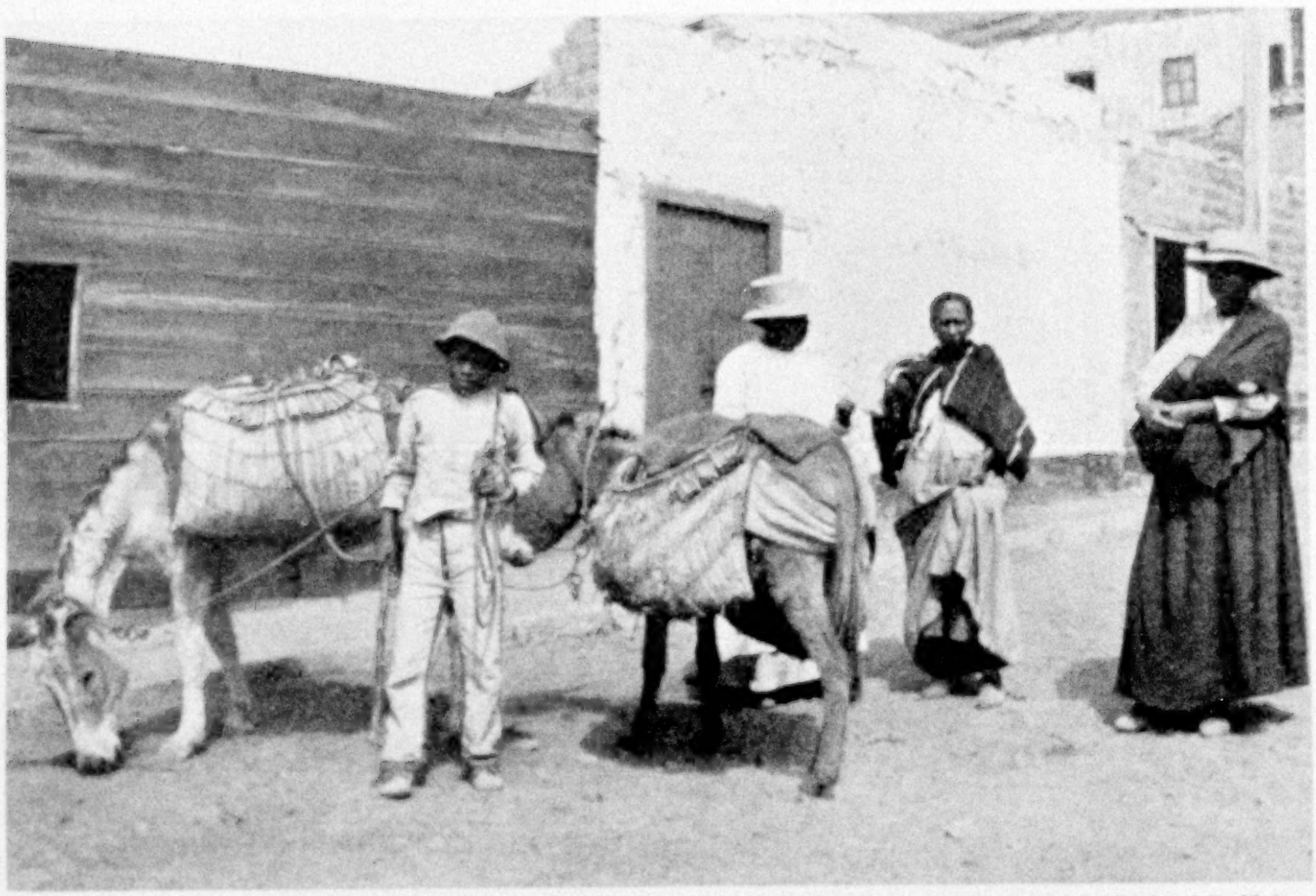
PASSING ACONCAGUA—HIGHEST PEAK ON THE WESTERN HEMISPHERE

Twelve miles off to the right, Aconcagua, highest point on the Western Hemisphere, pierces the floor of clouds, a hill of ice on a white cloud plain. Mariners miles at sea can sight the majestic peak, looming high behind the Chilean coast; but here, as we drove ahead, around its

Photograph by Jacob Gayer

STEAMERS TAKE ON NITRATE WHERE MOUNTAINS COME DOWN TO THE SEA

Small Chilean ports have none of the panoply of the world's great harbors, yet the small boats that carry the spoils of the desert to the ships anchored offshore bear cargoes of fabulous value.



Photograph by Richard B. Hoit

PRODUCE VENDERS LEAD LADEN BURROS THROUGH ARICA STREETS

Old customs still prevail in this important port of northern Chile. The panniers in which the fruits and vegetables are carried from door to door are woven from a flat reed or grass resembling raffia.

ice cap at more than 100 miles an hour, we were slowly pivoting in infinity, and Aconcagua's projecting top seemed small in that unending empty horizon of white.

Our plane was the only sign of life in the vast void above the world, higher than anything which moves, except man with his machine-made wings; higher than all else there, except Aconcagua's frozen 23,098-foot tip. Only a few peaks in the Himalayas and elsewhere in Asia are higher than Aconcagua.

The pilot turned suddenly and pointed to the left. There, flashing into view—only a flash and it was gone—passing at 200 miles an hour, was another plane, the French air mail bound for Europe via speedy naval destroyers from Natal, Brazil. Millions of sparks twinkled in front of aching eyes, and the little blue speck in that hollow, unearthly world seemed unreal, a torpid brain unable to sense the significance that here three continents were being linked through the air.

The myriad of sparks recalled Lappland, in Soviet Russia, a couple of winters ago. Lost on a sled on an ice-stilled lake, reindeer teams plunging in aimless circles, trying to find the trail; the same sparks before the eyes, and the stocky Lapp driver insisting it wasn't snow, only frost. There we were level with the sea, and here more than 20,000 feet above it, but the waste of unblinking snow was the same.

DROPPING FOUR MILES IN EIGHT MINUTES

"We're over the worst," the mechanic shouted, coming back and sitting down. It had not seemed so bad to me, braced comfortably in a seat. In the cockpit the pilot stretched and shook his shoulders. Nothing more to do but come down, and we came. The little clock said 10:15 when the finger on the altimeter was still hanging on to 20,700. Then he turned the nose down. A moment of oblivion, as we cut through the clouds, suds of cold steam, and then Santiago was right ahead. The clock pointed to 10:23 as the tail caught the ground at Los Cerrillos Field, only 1,700 feet above the sea.

Down 19,000 feet in 8 minutes is a

Photograph by Jacob Gayer

TACNA YOUNGSTERS PLAY WHERE BATTLES ONCE WERE FOUGHT

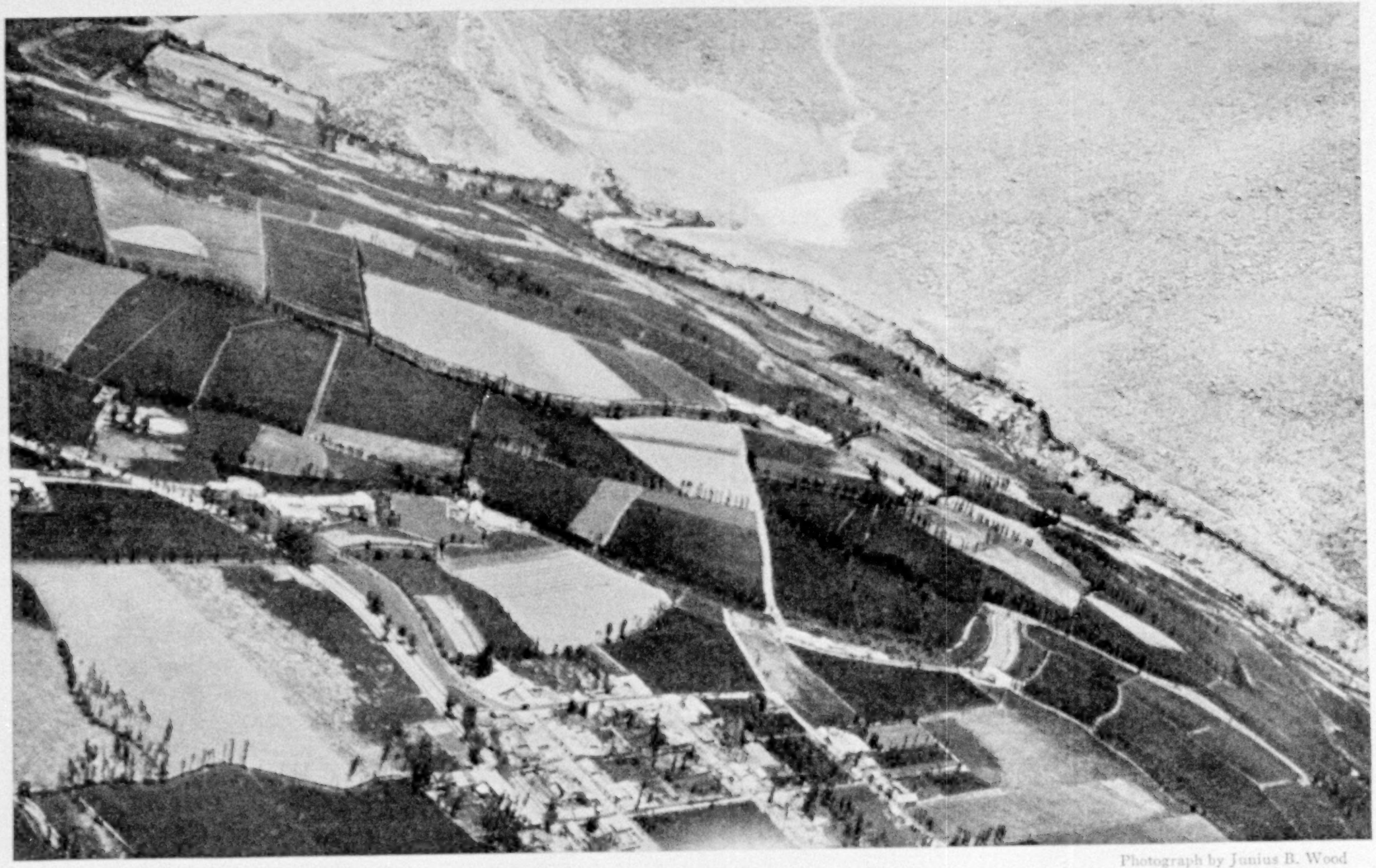
History records few struggles more bitter than that between Chileans and Peruvians for possession of this now peaceful city of pleasant homes, busy streets, and shady parks. In the final settlement of the dispute, on July 28, 1929, it was definitely given to Peru, while the port of Arica (see illustration, page 282), also an object of controversy, went to Chile.

sudden change. Ears were cracking like a battery of machine guns, and the back of the head seemed squeezed in a hydraulic vise. Even the thickest skull would feel that change; but the agonizing pain is quickly cured. Lessons of childhood days, when mamma held a handkerchief and said, "Blow hard!" come back. Just hold a nose tight shut with one hand and blow an imaginary blast. The heavier air of the lower altitude forces out the rarefied ozone in brain and ears and the pain goes as quickly.

A smaller, but faster, single-motor plane was waiting, already warmed up. We should have been in Santiago before dark on the night before, making the trip from Buenos Aires in a day. Three-quarters of an hour for the change, mostly conversation, and we were spiraling off the field, turning north over alluring Santiago, of parks, mountains, and gushing mountain torrents,* to follow the fertile, longitudinal valley of Chile.

As we climbed to 10,000 feet the green carpeted plain beneath spread between the mountains, tabloid farms two miles below,

* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Twin Stars of Chile," by William J. Showalter, February, 1929.



Photograph by Junius B. Wood

AT TIABAYA THE DESERT MEETS THE SOWN

Irrigation has created a veritable garden spot about this Peruvian city, 8,000 feet above the sea. From the air the contrast between the cultivated fields and the arid waste appears in striking sharpness. A long, unbroken line of trees protects the watered lands from the sand-laden winds that sweep constantly across the barrens.

Photograph by Ewing Galloway

THOUGH THE SECOND SEAPORT OF PERU, MOLLENDO HAS NO HARBOR FOR LARGE SHIPS

Here, as elsewhere on the Pacific coast of South America, vessels of deep draft cannot approach the wharves, but must anchor far offshore. A small breakwater affords protection for cargo lighters and other small craft. The town serves as an ocean gateway for Arequipa, as does Callao for Lima (see illustration, page 300).

Photograph by Jacob Gayer

EMBARKING AT MOLLENDO AFFORDS A REAL THRILL

Even in calm weather the swell in the harbor is so heavy that small boats are bounced up and down like corks. It is no mere matter of walking up a gangplank for passengers to go aboard a steamer. Often they must be lifted from a tender to the deck in a chair operated by a steam crane.

patches of trees, and a dry river bed, stretching on the west to the coastal cordillera and on the east to the first range of the Andes, with Aconcagua's white peak, which we had circled only a few minutes earlier, towering over all and seeming close at hand.

FLYING BETWEEN OCEAN AND MOUNTAINS

In 45 minutes the Pacific was in sight on the left, a line of white surf along the rocky shore, and we were flying midway between ocean and mountains, over a 120-mile-wide ledge on the edge of the continent. Even that shrunk narrower in the next hour and a half and the green grew smaller. We crossed high over a river at the foot of a steep bluff, turned and came down on the Army field, with its gaudy yellow hangar, on the high plateau at Ovalle.

The Chilean Army maintains a commercial aviation service, carrying mail and passengers, and eventually the Navy will fly between Puerto Montt and Magallanes (Punta Arenas), linking the entire 2,600 miles of the long, narrow country.*

Civilian flying is required as a part of Army training, a practical use for military aviation. Private companies are required to carry an Army officer on every flight, to acquaint him with different planes and to prevent outsiders from rambling around the country or photographing military secrets.

At every flying field in Chile the officers were friendly and hospitable. Some of them had trained at Army schools in the United States. They were pleased to have their planes and well-kept airdromes photographed, and the one aboard our plane would have satisfied the most ambitious film salesman, as he zealously pointed out picturesque spots which he thought ought to be "shot."

The Chilean Government not only gave

* See, also, "A Longitudinal Journey Through Chile," by Harriet Chalmers Adams, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1922.

Photograph by Arthur Dailey

AREQUIPA LIES IN A GREEN OASIS OF THE ARID ANDES

At the foot of El Misti Volcano (see illustration, page 288), about 8,000 feet above its port of Mollendo (see illustration, page 285) and 100 miles inland, the "City of the Stars" is one of the loveliest places in Peru. Its cathedral of white stone (in the background), facing a splendid plaza, covers almost an acre of ground. Shops of many colors lend charm to the market place. The fertile valley surrounding it is watered by the Chile River.

Photograph by Junius B. Wood

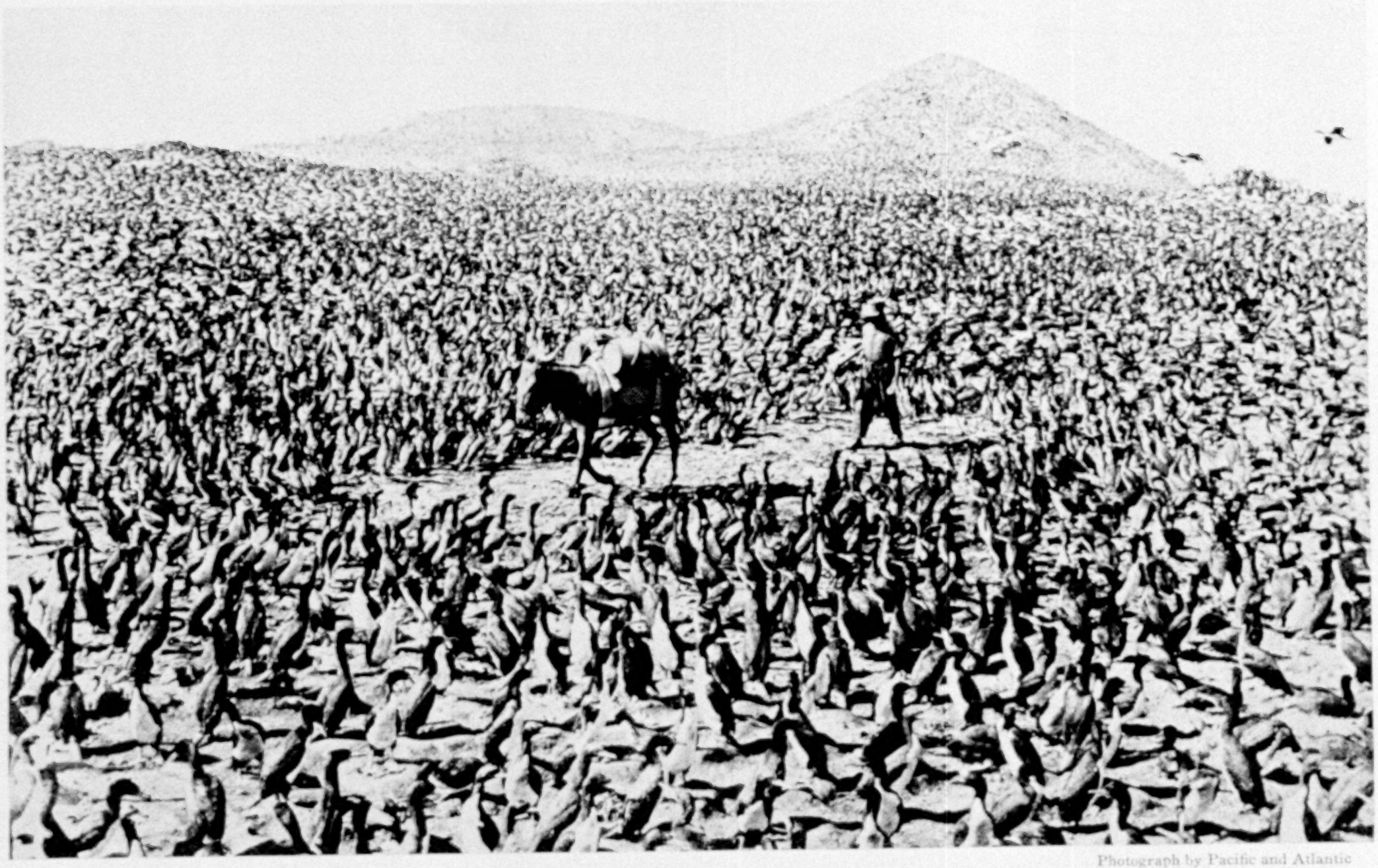
AIR MAIL IS SORTED OUT OF DOORS AT AREQUIPA

The plane on which the author made his journey stopped for only a few minutes at the city a mile and a half above the sea to pick up passengers and deliver letters (see text, page 295).

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

EL MISTI YAWNS AT AN ALTITUDE OF 19,250 FEET (SEE TEXT, PAGE 305)

The rugged giant towers over Arequipa (see illustration, page 287), and often sends clouds of sulphurous vapor a thousand feet into the air and sometimes spits out hot water and steam from its half-mile-wide crater.



Photograph by Pacific and Atlantic

BIRDS ON THE GUANO ISLANDS SHOW NO FEAR OF MANKIND

In myriad flocks these peculiar creatures, which abound off the coast of Peru, darken the landscape for miles (see illustration, page 294). As the water-carrier passes among them with his burro, they are not frightened, but move aside with dignified slowness to make way for him.

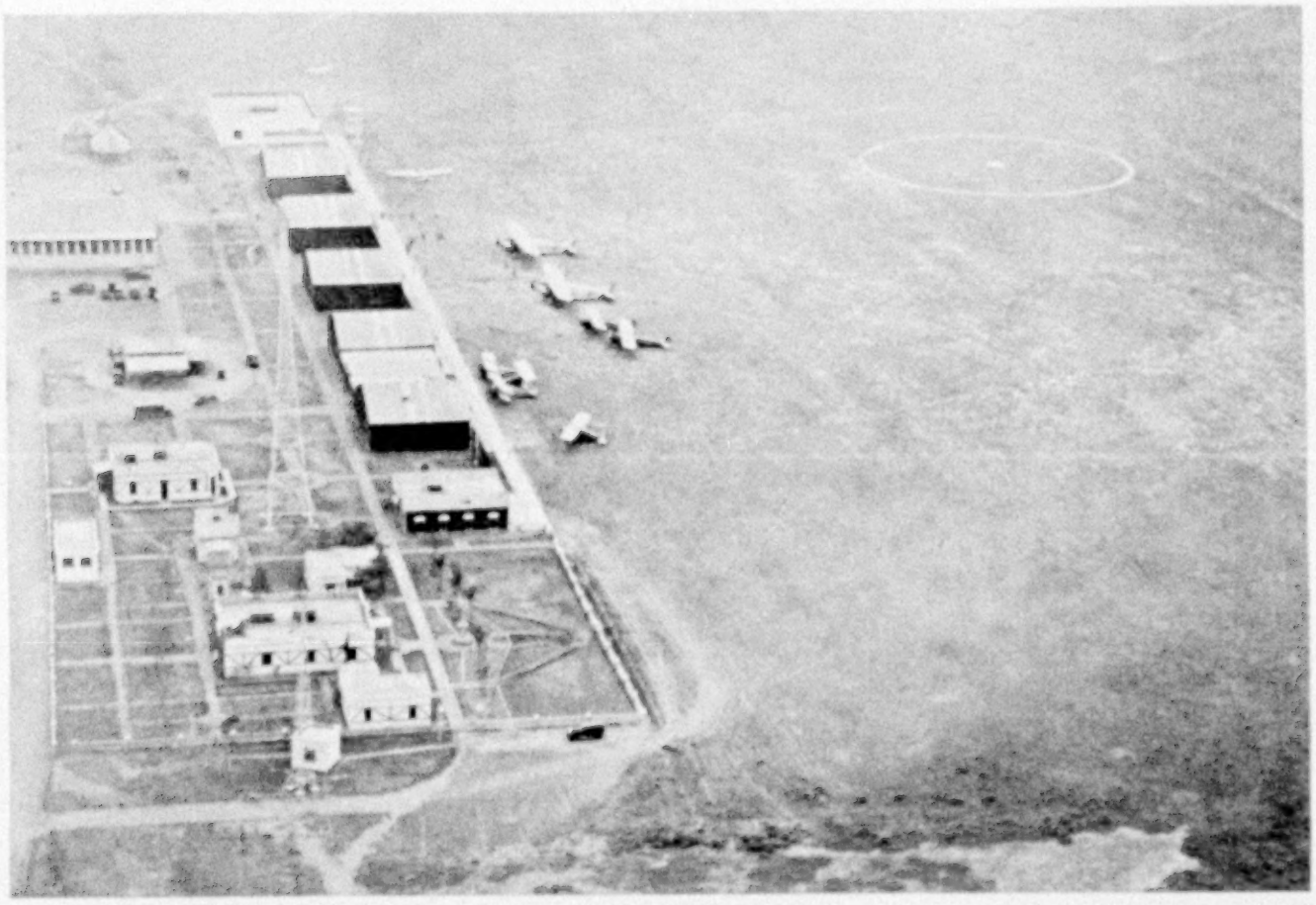
Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

PERUVIAN VILLAGES NESTLE IN VALLEYS ACCESSIBLE ONLY BY PACK TRAIN OR AIRPLANE

Shut in by cordilleras, many peaks of which rise to altitudes of 18,000 to 20,000 feet, these remote settlements have changed little since the days of the Incas, who probably built these terraced farms.

special permission for me to ride in a plane which did not have a permit to carry passengers, but ordered its rural telegraph offices to remain open at night until my cables were sent. The reputed unfriendliness of Latin Americans to the United States may be one of policies, often justified, but it does not extend to the individual who accepts their hospitality in the same friendly spirit with which it is offered.

At Ovalle our northbound plane met the one, the same make, but painted a hilarious red, bringing that week's mail from the United States. The loads were exchanged and each turned backward. The one from the north brought 70 pounds. We had started from Buenos Aires with 34 pounds and had picked up 20 more in Santiago. That going north carried about $1,800 in postage stamps, of which around 10 per cent went to the two countries and the balance to the United States Post Office Department.



Photograph from Junius B. Wood

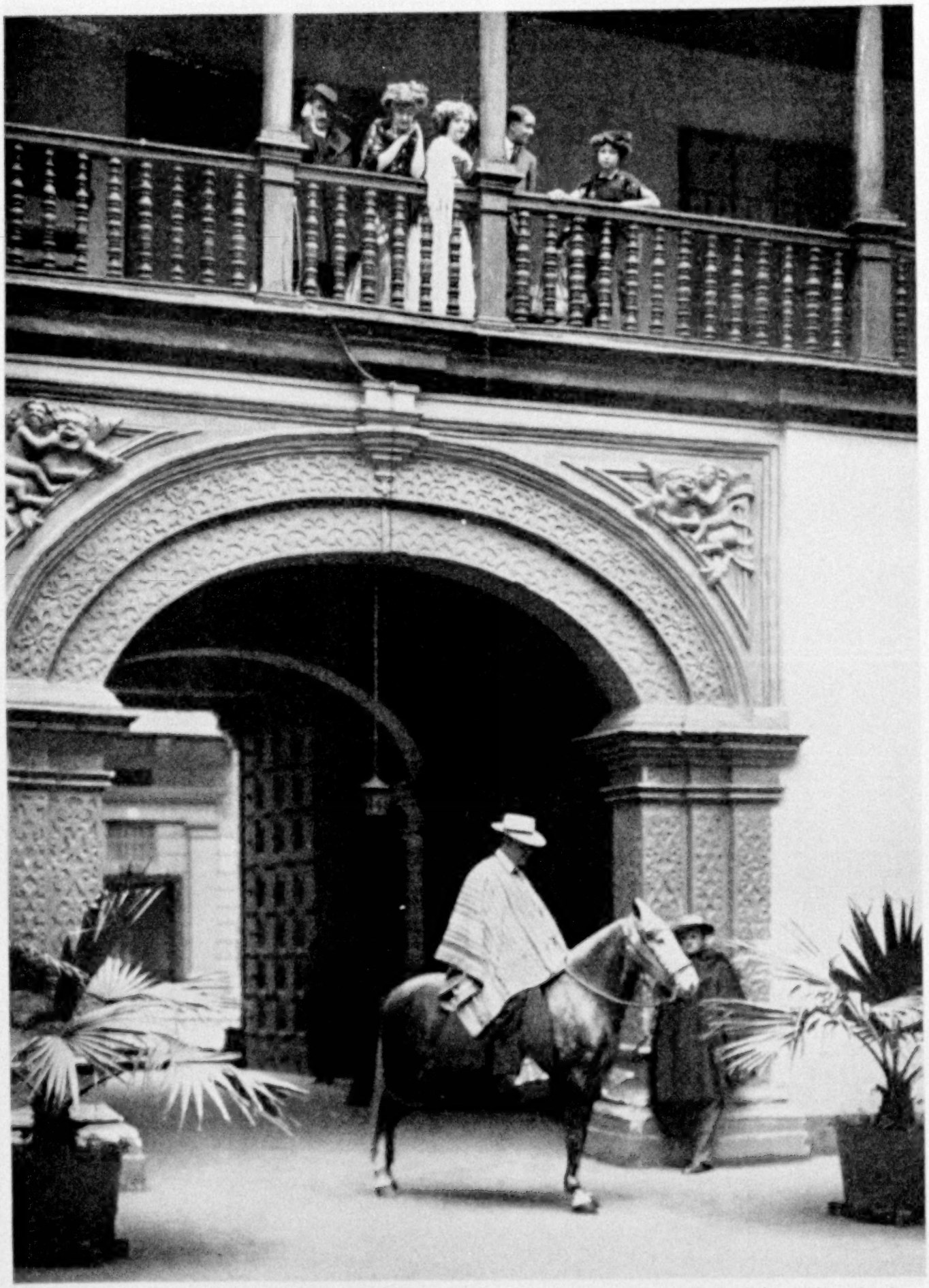
LIMA HAS EXCELLENT EQUIPMENT FOR AVIATION

Las Palmas Flying Field, 10 miles outside the city, provides facilities for Peru's air-mail service (see text, page 309).

Photograph from Pan-American Airways

AFTER SOARING OVER THE ANDES, THE GREAT BIRD RESTS AT LIMA

The airliner *Santa Rosa,* on Las Palmas Flying Field, is ready to carry passengers in comfort across mountain barriers that even the redoubtable Pizarro could not scale.



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OLD SPAIN SURVIVES IN LIMA

All the romantic charm of bygone centuries lingers about this courtyard of a private home in the Peruvian capital. Although the new part of the city has become ultramodern, the colonial section retains the grace of four centuries ago.

Photograph by Johnson Brothers

PIZARRO FOUNDED LIMA 43 YEARS AFTER COLUMBUS DISCOVERED AMERICA

The "City of Kings," as the Spanish general named it, had grown great a century before white men set foot on the site of Chicago, and was the capital of all South America when the United States were still British colonies. To-day, with a population of a quarter million, it is one of the most interesting places of the Western Hemisphere. In the foreground and middle distance is the modern section, with the large Hippodrome, the ovals of the two stadiums, and the Zoölogical Gardens; the old colonial district lies in the distance. The mummy of the conqueror of Peru is preserved in the cathedral and is still shown to visitors.

The arrival of the two planes is the Sunday event for Ovalle. Introductions were made to the commandant and to those whose local standing permitted them on the field. One whose rounded figure testified to years of faithful effort at many a groaning table singled me out with a twinkle of recognition. His English was perfect.

"When did you get to Santiago?" he asked.

"Only this morning, a few hours ago," I replied.

"But you've been there before?"

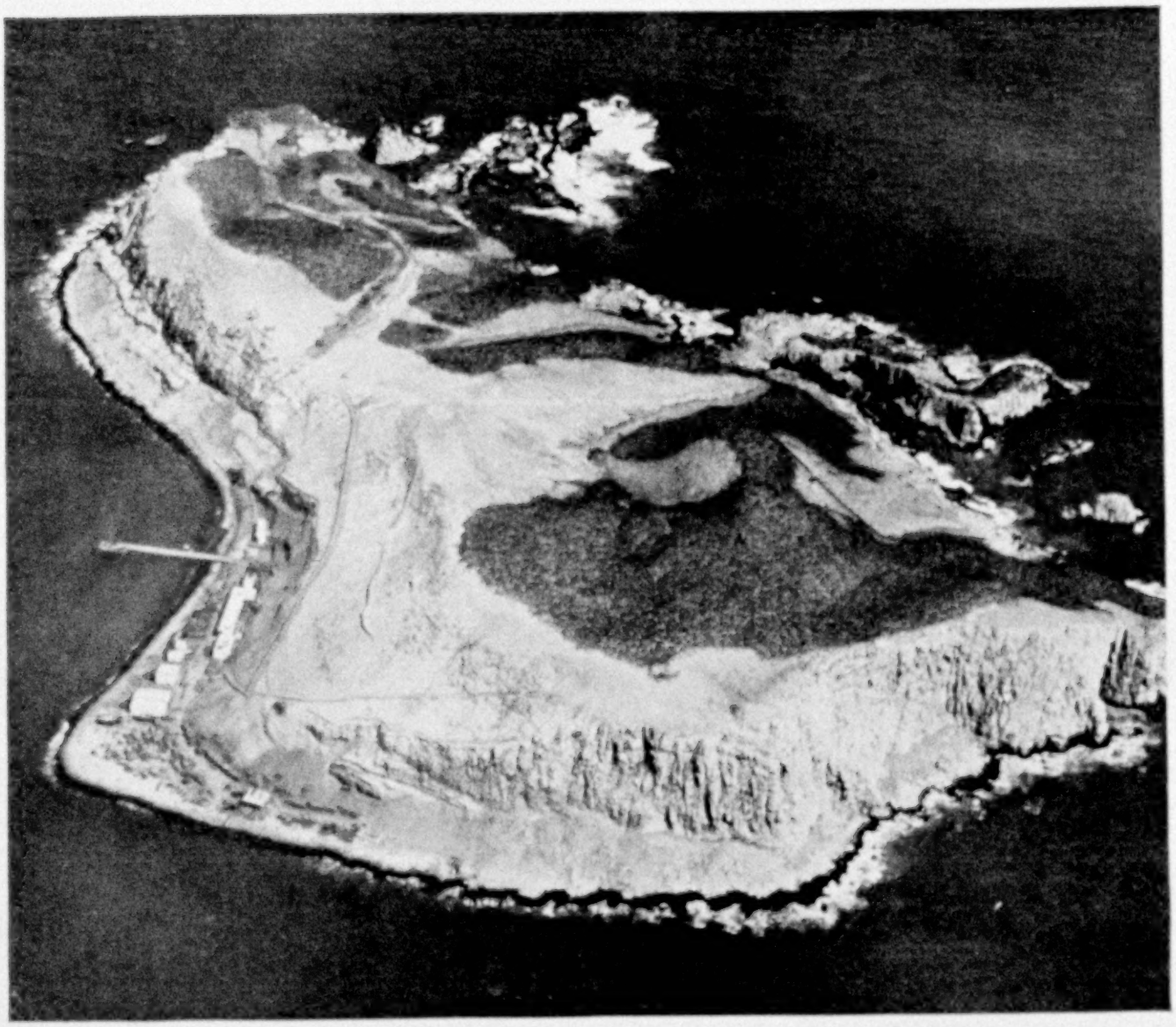
"Yes, about three weeks ago."

"Did you eat at the Restaurant Bahía?"

"Yes. Why?"

"My wife and I went over there for five nights and watched you eat lobster," he explained almost reverently.

We were in a distant country village. Seeing a hungry man rend a lobster limb



Photograph by Johnson Brothers

GUANO ISLANDS SHOW WHITE AGAINST THE SEA OFF THE COAST OF PERU

The dark areas are formed by thousands of birds. At the water's edge on the left is a settlement from which enormous amounts of fertilizer are shipped.

from limb in approved New England style, until the last morsel was mixed with sauce and butter, must have been an unforgettable sight for Chileans, who are accustomed to content themselves with a few slices which can be negotiated with a fork.

However, after providing such a run of entertainment for rural visitors to their national capital, one agrees that all novel customs in eating are not seen in strange lands. Its lobster, rather, *langosta* without claws, is the most toothsome of Chile's many sea foods. It comes from Juan Fernández Island,* about 350 miles from the coast, and my lifelong sympathy for hungry Robinson Crusoe vanished. That was the island where Alexander Selkirk lived the story, picking lobsters like pebbles off the beach and merely tossing them in the pot when Friday had the water boiling. Defoe held out on the free lobsters.

The third plane in which I had ridden that day rose from the field, made a wicked turn for altitude, and cut across, past the village on a side of the mountains, toward the ocean. Coquimbo, nestling on a blue bay with a white crescent of shore, was below; next La Serena, a square city on a narrow shore of plain at the end of a green valley. We followed along the narrow, wind-blown, sandy shore, buttressed by Nature's black granite breakwater. The white mottled peaks

* See, also, "A Voyage to the Island Home of Robinson Crusoe," by Waldo L. Schmitt, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1928.

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

BETWEEN AREQUIPA AND LIMA THE AIR MAIL WINGS OVER MOUNTAIN FASTNESSES

Everywhere is rock, save in occasional valleys watered by rivers. A more desolate region than this in the highlands of Peru would be hard to imagine (see text, page 307).

© Ewing Galloway

VISCAS BRIDGE CROSSES A VALLEY 15,100 FEET ABOVE THE SEA

The span is on the Central Railway of Peru, which climbs from Callao, on the Pacific, 140 miles, to Oroya, far up in the Andes, and then turns south to Huancayo. A branch line to the Morococha mines passes over the Continental Divide at an altitude of 15,865 feet, the highest point reached by a standard-gauge track.

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

WASTES OF LAND LEAP UP FROM WASTES OF WATER

Along the coast of Peru, Nature has been freakish, hurling desert mountains and rocky islands out of the very sea. Earthquakes are of frequent occurrence in this region.

were in the distance and the parched coast of the Andes had started.

COPIAPÓ FOUNDED MANY OF SANTIAGO'S FORTUNES

We passed Carrizal Bajo, known for its copper, with a highway showing back into the hills and a leg of the centipedelike longitudinal railroad reaching to the port. The land bulged out and water was no longer under our wheels. Gashes on the distant hills seemed like cliff swallows' holes, red hills with white cart roads winding down; then a green valley beyond, over a crest, and we were spiraling down on another Army field at Copiapó, back on schedule, where we would have stopped for the night if we had crossed the Andes the day before.

Once Copiapó was the largest city in Chile, after the Chañarcillo silver mines, on the old Inca trail, were rediscovered, in 1832. They are worked out and flooded now, but they founded many of to-day's big fortunes in Santiago.

Copiopó is now a quiet country town, basking in the sunshine and dust. "Never rains more than twice a year, and then not much," they explain. The rattling open hack still does service, and this Sunday evening the population picked its way over the rough sidewalks to a band concert in the plaza, where a statue of Juan Godoy, a departed miner, stands among the cherished flowers and trees.

The scenic day was finished: Mendoza, cold and wet, at dawn; buffeted over the silent, frozen Andes before noon; Santiago, a picture city among its hills; the fertile green "Vale of Chile"; the Pacific breaking on a rocky coast, and now Copiapó, with its memories of Incas and mining booms and its sunshine and dust. Buenos Aires, the Atlantic, and the miles of Argentine pampas, though seen only yesterday, seemed far in the past.

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

CHILCA OF THE DESERT GAINS ITS LIVELIHOOD FROM THE SEA

One of many fishing villages of Peru, this little place south of Lima lies north of the nitrate fields which have brought wealth to the coast towns of Chile. Here a rainless waste of sand and rock extends from the ocean to the high Andes, a region seemingly destined to remain barren for all time.

Clouds hid the crests of the bowllike hills the next morning, as we taxied across the field in a cloud of dust. No break showed, but the pilot knew of an opening, as he rose toward the rim, fog sweeping to meet us through the gap like smoke from a giant stack. We came through, without hitting a corner, into sunshine on the other side, and on up to 7,000 feet.

The earth spread below like an immense relief map—a rolling sea of black and brown and red, with rocky crags and castles and deep-cut dry beds of forgotten mountain freshets, baked by centuries of sun and cut by winds which never cease. It is the same for hundreds of miles, but its riches have brought life into the desert.

Occasionally we would pass a copper or iron smelter or nitrate works, smoking stacks, broad roofs of mills, a fringe of little houses, and always, off at the side, an adobe-walled cemetery with the crosses of those who had given up the fight.

White lines on the darker waste marked trails over which carts were bringing the ore, or where men had trekked in search of more. All that vast stretch of desert

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

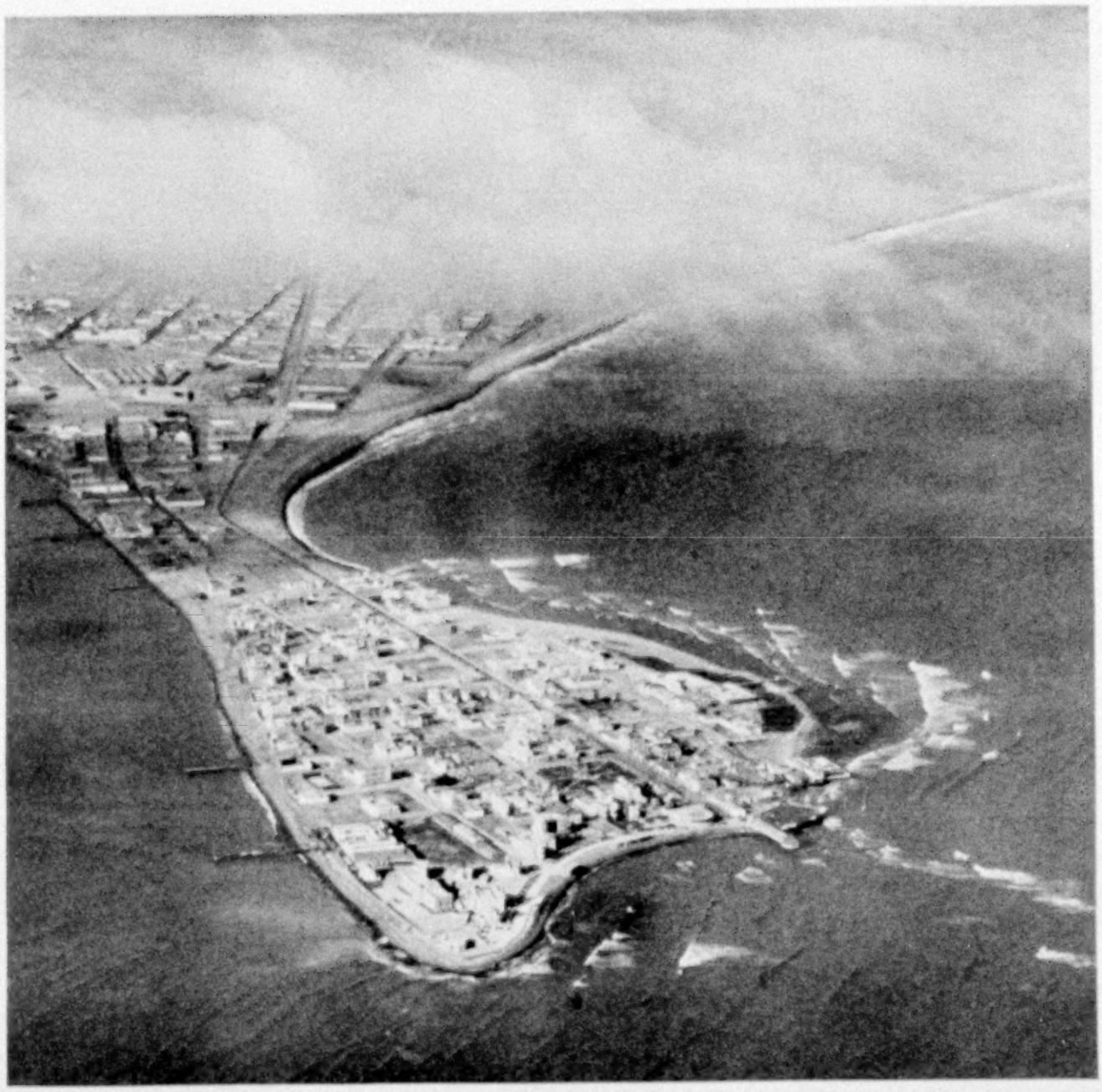
DUNES MOVE CEASELESSLY WITH THE SHIFTING WINDS

It would be hard to find a more desolate region than the coastal desert of Peru, where hills of sand seem to walk (see text, page 305). Yet even to this inhospitable shore commerce has come, with fishing villages, harborless and trusting to calm weather to enable freighters to approach their piers.

Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

PIZARRO FOUND THE INCAS ENTRENCHED IN THE FORTRESS OF PARAMONGA

Had the Spanish leader not captured their king, Atahualpa, at Cajamarca and put him to death, thus demoralizing their entire army, the Indians might have held this stronghold on the coast of Peru, about 100 miles north of Lima, as the crow flies. Its painted walls, which stand intact to-day, were thick and had withstood an assault by the conqueror's brother, Hernando. Most of the chiefs, however, surrendered without a show of resistance, after the downfall of their ruler.



Photograph by Peruvian Naval Air Force, courtesy Capt. H. B. Grow

CALLAO, THE PRINCIPAL PORT OF PERU, HAS ONE OF THE FINEST HARBORS ON THE PACIFIC

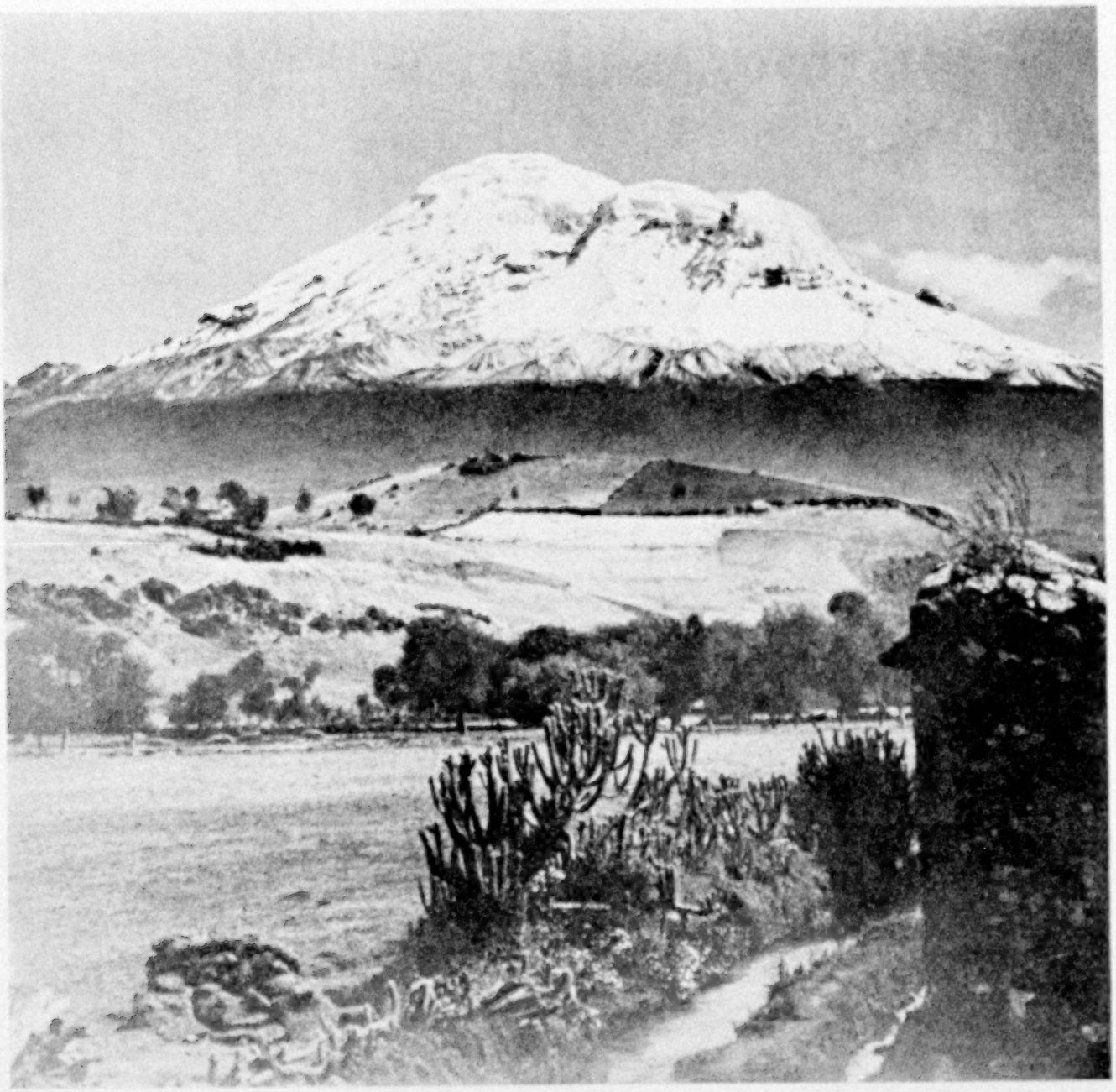
Adequate docking facilities enable the largest steamers to discharge freight directly on the wharves instead of mooring offshore and lightering cargoes to land, as they must do at many of the other coast cities (see illustrations, pages 272 and 285). Improvements representing an outlay of more than $6,000,000 are now in progress, and two long breakwaters are being constructed to provide a large body of protected water. The busy, cosmopolitan city of 50,000 is the ocean gateway for Lima, the capital city (see illustrations, pages 291, 292, and 294).

is pockmarked with holes which prospectors have dug, methodical corners of perfect squares.

OVER CHILE'S EARTHQUAKE ZONE

"This was flattened by an earthquake; a few days ago they were hills," the pilot shouted back, pointing below. The wrinkled and broken surface looked like one of those cakes which home bakers take from the oven and exclaim, "It's fell." We were over Chile's liveliest earthquake zone, accustomed to a couple of shocks a day, but with serious disturbances not expected more than twice a year. The one the previous week had been serious, but most of its force was felt in the unpopulated area. From my experience with earthquakes, to use an airplane is the best way to see one.

The speeding plane bumped and tossed over the constantly changing surface.



Photograph by Horgan

CHIMBORAZO LIFTS ITS SNOWY SUMMIT NEAR THE EQUATOR

The giant peak that frowns above Guayaquil has its feet in tropical jungles and its head in an eternal cap of ice. Rich deposits of sulphur are found on its slopes. Near by looms Cotopaxi, the highest active volcano in the world.

Heat waves radiated up from below in waving currents. A lighter-than-air ship would have had a terrible crossing. Dust blew into the cabin 1,000 feet high.

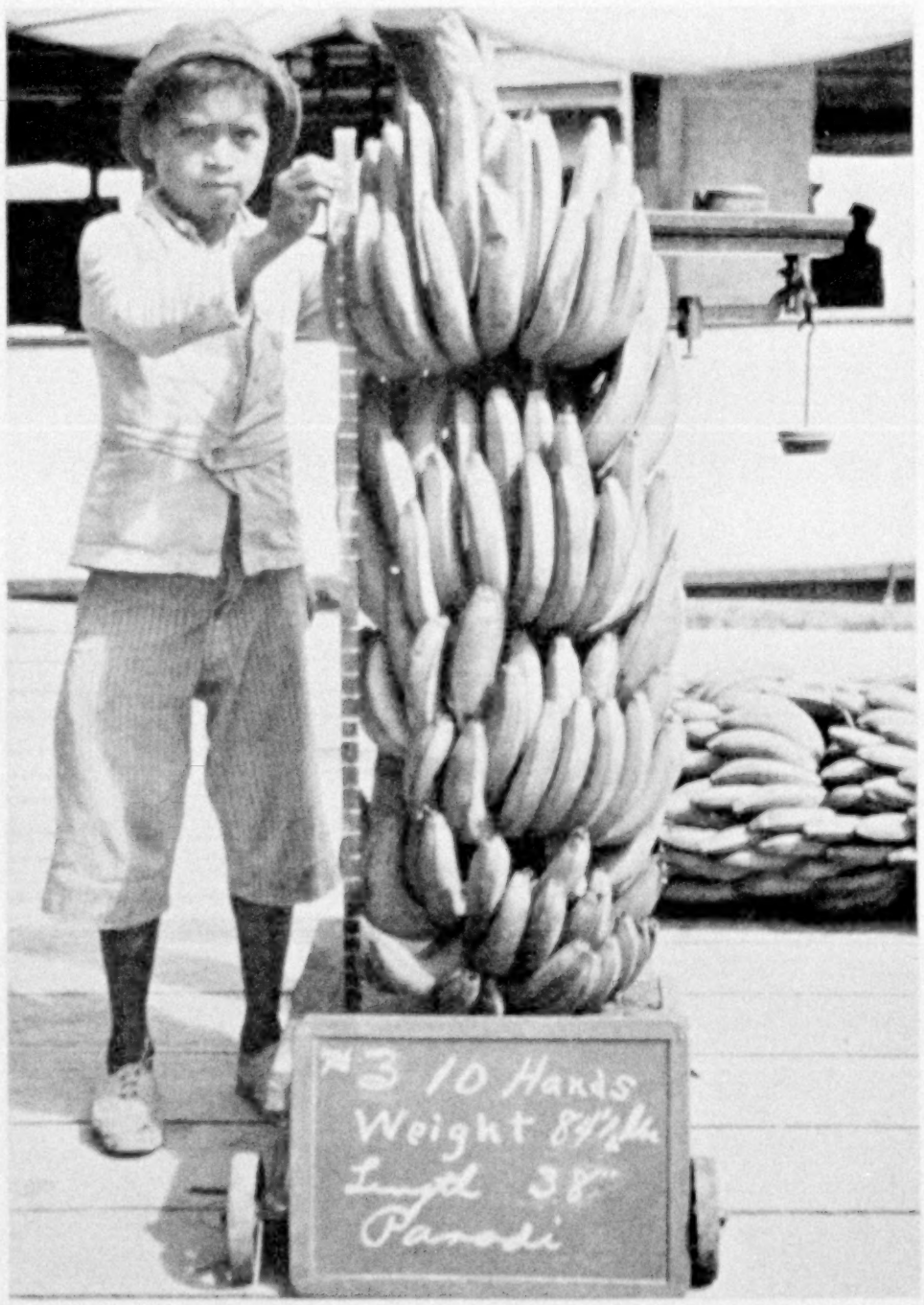
Then came the scattered nitrate plants of Salinitas, with a crisscross of trails spreading out and fading into the distance (see illustration, page 278).

Antofagasta, on the coast, was glimpsed through a break in the hills, as the plane came down on Puertozuela Field. Four silvered Army planes, a red and white circle with a white star on blue painted on each wing, stood in a straight line in front of the yellow hangars.

We cut across the 40-mile neck of a peninsula and in 20 minutes were passing Mejillones and over the Pacific where Point Angamos crooks out like a thumb and forms a bay.

MINERALS KEEP CHILEAN DESERT TOWNS ALIVE

Flying over the ocean through the afternoon was smoother, but over the desert any spot was a landing field, while here was only water. The surf pounded along miles of rocky coast, with rarely even a barren island to break its force. When the cliffs rose straight from the water and



Photograph by Ewing Galloway

ECUADOR CLAIMS FIRST HONORS FOR LARGE BANANAS

On a dock at Guayaquil a native boy displays a prize bunch of the fruit for which his country is famous.

a mist rolled in from the sea, we would turn out to give the projecting claws a wider berth. At other places we would see a narrow ledge of shore with a road, occasionally spreading into a little plain, with a town and a wagon road or railroad winding down the hillside in back. Each would have an iron pier and ships anchored in the unprotected roadstead, loading the minerals which justified the town's existence.

Gatico's mills smoked on Cobija Bay; then came Tocopilla, with ships on the anchorage, little brown houses, and smokestacks and a railroad; Pabellón de Pica, with a road like a balcony on stilts around the sugar-loaf cliff; Patillos and a railroad which disappeared between walls of sand, and then Iquique, spreading over a flat spit of land, a dozen ships in the harbor, a highway coming down in six zigzags, and the railroad in two longer gashes across the steep hill behind.

Ten minutes more and we hum past Caleta Buena, its ledge between shore and cliff so narrow that in the distance it seems a line of driftwood cast up by the waves. Junin, with its long iron nitrate pier, has slightly more room, and the road cuts only two zigzags on the cliff.

Half an hour more of unbroken shore and the plane, bucking like a bronco, was fighting the wind whistling around another rocky point. We made it and a broad green valley opened ahead; surf breaking right beneath, on Alacrán Island, once a Peruvian fortress and now covered so thick with millions of birds that they looked like wriggling worms; two long black piers and two ships farther out. Arica sparkled in the sunshine; Hotel Pacífico facing the bay; cool, straight streets lined with bougainvillæa, peppertrees, and hibiscus; a ready-made iron church from Monsieur Eiffel, of Paris; El Morro's steep black sides towering above, with a golf course on top, 18 holes and not a blade of grass; Tacora's snow-clad peak far ahead, and we were over the city, coming down on El Buitre Field.

Photograph from Pan American-Grace Airways

ILINIZA THRUSTS ITS PEAK TO AN ALTITUDE OF 17,500 FEET

As an airplane in flight from Guayaquil to Quito, in Ecuador, passes over the summit of this snow-capped mountain, the cloud "ceiling" becomes a floor, cutting off vision of the tropical land below.

The Chilean frontier had been reached. Arica, scene of many a battle, has settled down to the piping days of peace. Even the half century of desultory Tacna-Arica dispute has been settled since President Hoover's visit. Both were scenes of sanguinary battles in the Chilean-Peruvian War of 1879–82, also known as the War of the Pacific.

ARICA A CITY OF IMPORTANCE EVEN IN INCA TIMES

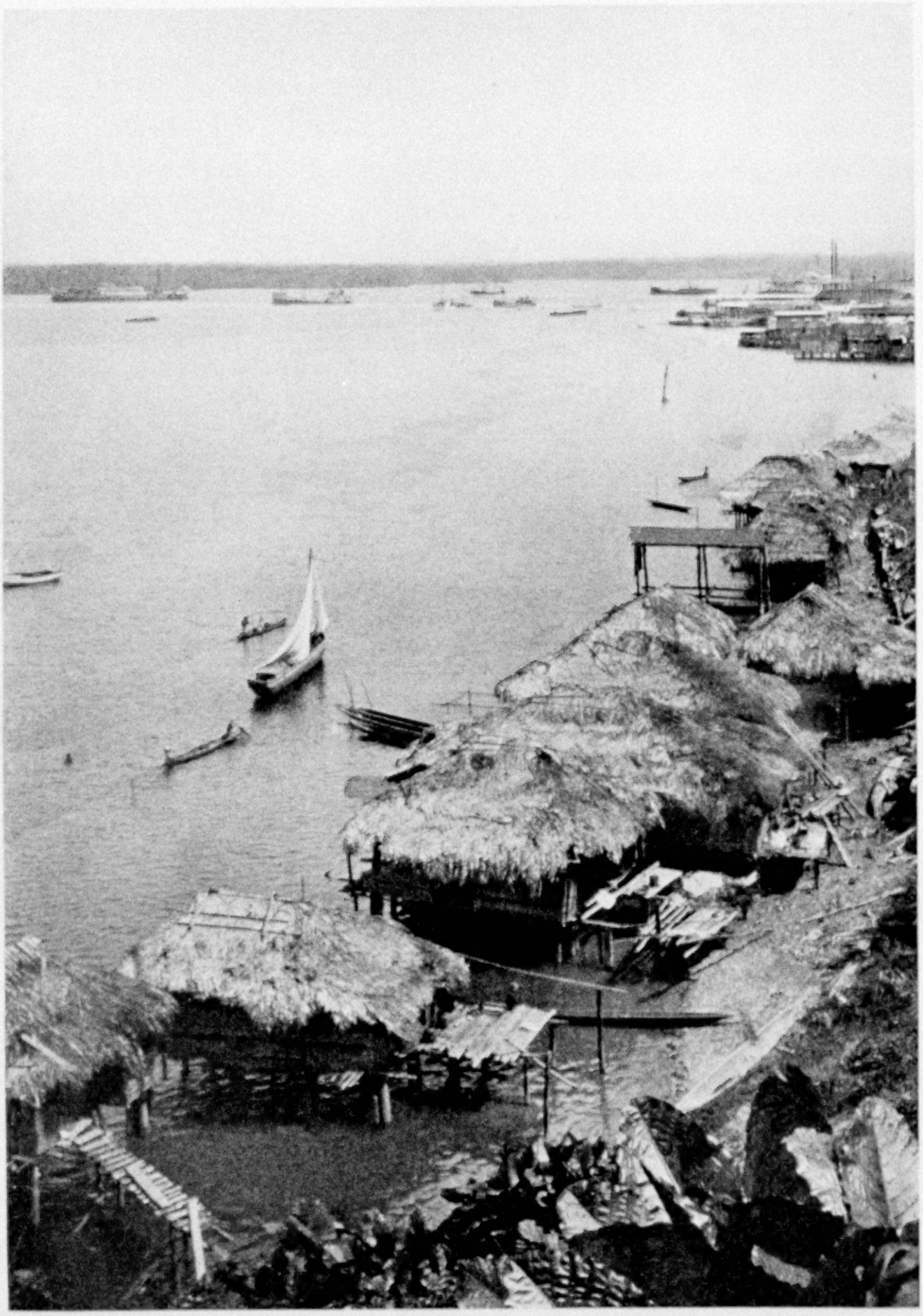
Arica existed before the Spaniards came, before the Incas. It was the port for the silver from Potosí and its population then was five times its present 9,000. Drake, Cavendish, Spilbergen, Watling, Sharp, and other pirates landed and attacked from El Morro's heights, but none captured it; and Watling, according to legend, was killed by one of the women defending the city (see, also, page 282).

Four earthquakes destroyed it, the last in 1868, accompanied by a tidal wave which not only wiped out the city, but drove the shipping on the shore. The United States ship *Wateree*, a side-wheel gunboat, was carried nearly two miles inland.* Its hull was a hospital during the war between Chile and Peru, and later a lazaret during a plague. The boilers, still on the beach, are pointed out to-day, and the Stars and Stripes again waves from its flagpole in front of the offices of an American shipping company; but the only social event which Arica could offer this Monday evening was to turn out and see the weekly train start its 14,400-foot mountain climb to La Paz, capital of Bolivia.

MUD ROOFS SUFFICE IN RAINLESS TACNA

The morning sun was just tinting Alacrán as we shot out to the ocean over the sandy mouth of the river, gained altitude, turned back, and twenty minutes later were coming down in a sharp circle over Tacna, a flower garden of red, pink, blue,

* See, also, "Some Personal Experiences with Earthquakes," by Rear Admiral L. G. Billings, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1915.



Photograph by W. Robert Moore

QUAINT BUENAVENTURA IS THE CHIEF PACIFIC GATEWAY OF COLOMBIA

On an island at the head of Buenaventura Bay and at the mouth of the Dagua River, this little town is the outlet for the charming city of Cali and the great Cauca Valley, called, because of the politeness of its people, the "Land of the Gentle Yes." A large proportion of the population of the port are Negroes, whose thatched huts line the shores (see, also, text, page 317).

and white houses with roofs of tin or adobe (see, also, page 283).

"There isn't any rain," a passenger explained at my astonished exclamations. Naturally they cannot have rain or an adobe roof would melt. The difficulty is to get enough water from the mountains to make mud bricks for a roof.

Half a dozen Peruvian soldiers, American-cut khaki uniforms with added leather and yellow trimmings on hats and shoulders, stood around, for we were carrying passengers. Over 30 miles of wind-swept plain, frightening a burro pack-train plodding up to Puno and Lake Titicaca; down through a dull haze, through a gully, and we were out over the ocean again. We cut in once more behind the lighthouse on Coles Point, bumping in the air pockets over land and down at Ilo in a broad valley.

Out again over another green valley, no larger than an Iowa cornfield, and the pilot pointed to a whale swimming below. Life has become complicated for whales since the days when men chased them with skin canoes and bone harpoons. Hundreds of sea lions sunned themselves in a little sandy cove, and thousands of frightened birds took to the air as we passed their white guano-covered rocks.* Level with the plane, they seemed to be flying backward, so much faster were we moving.

Diagonals of irrigation ditches showed in another valley opening to the sea. Balnearo de Mejia, with a Moorish mirage of red, green, and blue roofs; and Mollendo, on a ridge between fissures, was ahead, Islay Point jutting into the sea.

Aviators say there is always a current from the Pacific, revolving by the suction of the heated air rising from the pampas striking the mountains and rolling back again to the sea, but leaving a continuous fog on the coastal plateau, which makes flying there impossible.

THE THRILLS OF THE DAY ARE AHEAD

A straight white chalk line across the rock-sprinkled plain and a flapping red "wind sock" on a little pole formed the aviation field at Mollendo, as insecure for airplanes as the harbor is for ships.

Arequipa is about 7,500 feet higher up, and the thrills of the day were ahead. The plane took off toward the mountains, circled a bank of clouds, and out again over the sea, until Mollendo was 2,000 feet below; then it turned back and pointed upward. At 2,500 feet it was in the thick, soupy mist, the world blotted out and drops pattering on the windshield like rain; 3,000, and a faint blue showed in the glow above; 3,700, sunshine breaking through; 4,000, and the ceiling of clouds stretched white below. Ahead were the snow-covered peaks of the Andes, towering to upwards of 20,000 feet or more: Ampato; Chachani, its black peak flecked with white; El Misti, springtime snow thinning on its graceful cone, and, last, the saw-toothed white ridge of Pichu Pichu.

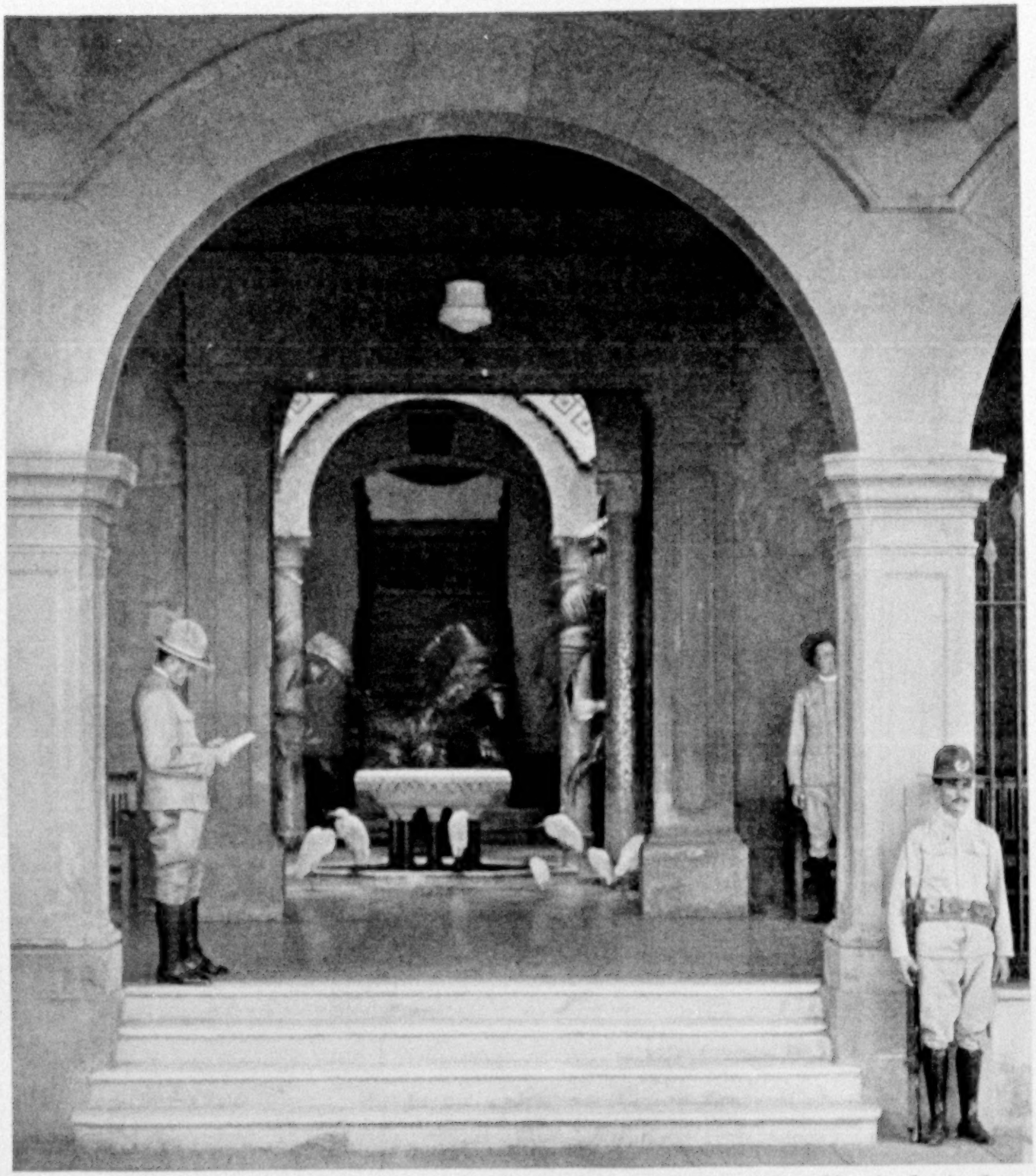
We were still climbing; 5,000 feet over a dry flood-washed plain; 6,000, 7,000, air getting thinner; 8,000, 9,000, 10,000, and over the first ridge of the Andes to a freshly irrigated green valley in the center of the barren sierras. Tiabaya (see page 284) was below, jewel of a town, with the mausoleums of the dead more noticeable than the homes of the living; and Arequipa a couple of minutes beyond, at the base of El Misti (see pages 287, 288).

CREEPING DUNES MAKE PERFECT CRESCENTS

The sandy plain on the plateau was marked by hundreds of dunes, scattered like haphazard earthworks of an army. Of different heights and widths, but all perfect crescents, they faced in the same direction and, according to those who have marveled at them, steadily advance at a rate of 40 to 50 feet a year. That they move before the south wind, centers higher and thicker than the tips, is easy to see; but why they start, or keep up their crawl in irregular skirmish formation, or do not unite into one big crescent, requires longer study than from a speeding airplane. Years later they will reach the mountains and vanish into the air, but man's only way to divert an invasion is by piling rocks on one horn until the dune dissolves.

At that altitude, we took off with the wind, going back, and for 25 minutes fol-

*See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Peru's Wealth-Producing Birds," by R. E. Coker, June, 1920, and "The Most Valuable Bird in the World," by Robert Cushman Murphy, September, 1924.



Photograph from Visual Education Service, Inc.

PANAMA MAY JUSTLY BE PROUD OF THE PATIO IN THE PRESIDENT'S PALACE

Pearl-shell columns, palms and other tropical plants, and a central fountain, about which stalk stately white egrets, make this spot one of sheer delight. The building from the exterior is not impressive.

lowed a narrowing ribbon of green in the immense waste. We had reached the coastal range, down to 5,000 feet, with clouds sweeping up from the sea like smoke from a forest fire. We dived into them, flying blind; 4,000 feet, and they were breaking below; 3,800, pilot peering right and left and a rocky tongue of land between two bottomless canyons sticking across our nose not more than 200 feet below. We cleared it, seemingly by inches, headed toward what looked like a solid wall.

He swerved and dropped, so fast that it was 3,000 feet before I landed on my seat again, and we were in another narrow canyon, sides not far from the tips of the wings, clouds right above and a

AFTER THE RIGORS OF ANDEAN FLIGHT, THE AUTHOR ENJOYS A PIPE AT DAVID

The third city of Panama, situated in a luxuriant valley near Chiriquí Volcano, is a delightful place to rest. In the picture, left to right, are: one of the mechanics for the airline company, Junius B. Wood, the author; Patrick J. Hurley, then Assistant and now Secretary of War; Lieut. Robert B. Williams, of Texas, and Lieut. James Bailey, of Alabama.

little stream far below, flowing toward the ocean. He throttled down and banked, as the plane rocked around a hairpin turn and down to 2,000 feet. Another thousand feet and the sun showed in a dull haze, then broke through, and we were crossing a dry plain; skimmed the ocean and came down at Camaná.

"Good while it lasted," said the pilot, but nobody asked for more.

The little green valley and town were left behind and for an hour we flew over the ocean under a low ceiling of clouds, with thousands of sea lions and birds on the rocks, and once a splashing speck of rowboat below and the barren, rocky shore on our right.

OVER THE IRRIGATED COTTON LAND OF PERU

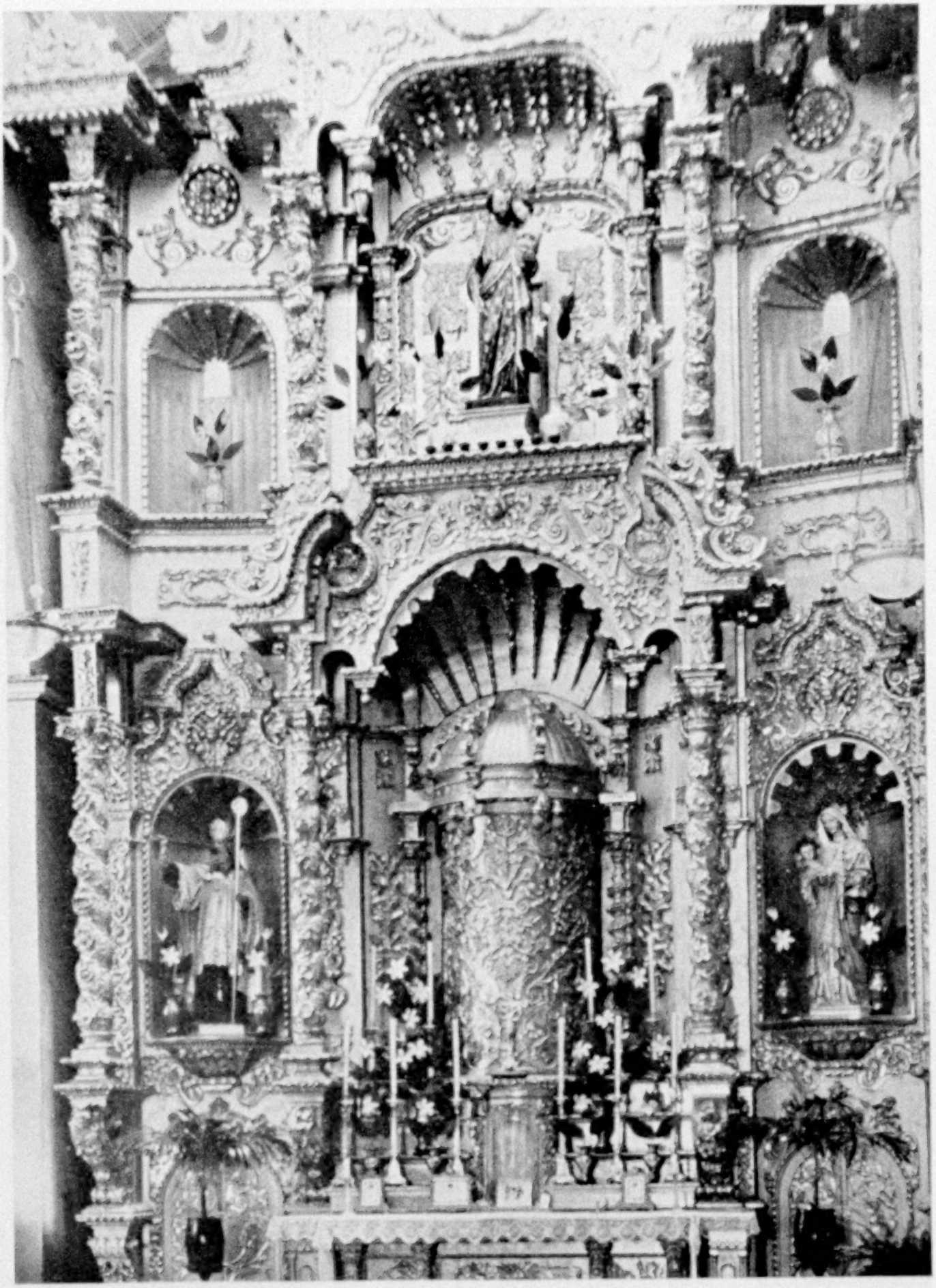
The land came out to meet us, and we were over a great, ghastly plain of wind-swept rocks, shifting sands, and half obliterated wagon tracks. We saw two trucks, white with dust, crawling along.

Across Yauca River valley, a fringe of green in the desert, and another stretch of plain started, just as desolate, but with a new road and traffic moving straight across to the mountains in the east. It ended with Ica River, a fertile valley where the Field Museum of Natural History has been exploring. Irrigated basins became more numerous, for we were reaching the cotton land of Peru.

The ocean jutted in and we came out over Pisco, a novel picture from the air, hexagon in shape, without straggling suburbs, a square plaza in the center and a long tree-lined boulevard stretching to the harbor, which is a thicker straight line along the shore—a Greek cross flat on the earth.

Little towns and a highway strung along the rainless coast, as we flew straight north over the sea.

Chincha Alta sat back, with half a dozen factories. From the little islands of the same name offshore, still white and covered with birds, enough guano has



© George E. Stone from Ewing Galloway

GOLD ENCRUSTS THE ALTAR AND PULPIT OF SAN JOSÉ, PANAMA

Disguised by a coating of white paint, this precious shrine was passed by as worthless by Morgan's buccaneers when they ravaged Old Panama. The unpretentious little church which then housed it was the only one in the city to survive the fires set by the raiders. Later the famous relic was removed to a new but equally obscure and plain structure, where it stands to-day seldom seen by the casual traveler.

been taken to pay the national debt of Peru; Cañete and a river and a row of red adobe houses against the background of green; Asia and the river valley where the country's first irrigation works were started by an American engineer; the big three-story hacienda where the battlers are bred for Lima's bull ring; then Chilca in the distance and more farms of cotton and sugar.

A WELCOME TO HISTORIC LIMA

A hill with what looked like adobe houses was pointed out as Inca ruins.* Callao and the new harbor were off to the left; Fort Real Felipe, where the Spaniards held out for 18 months against the colonists and now restored as a park; Frontón Island, where political and other prisoners who do not have their fare to Europe bask in the sun, and we were over historic Lima—new, broad, straight boulevards and parks and old walls of stone which have withstood the centuries. The motor throttled down and we came to rest on Las Palmas Field (see pages 291-293).

"Rather rough, wasn't it?" the American consul general mused as we stretched our legs while waiting for an automobile to take us into the city.

"About so-so," I agreed, for rough rides by now had become a daily routine.

"Anyway, you've a cut on your forehead," he insisted.

"That's so," as I rubbed it. "Must have gotten it when we took the bumps coming down from Arequipa."

Airplane as well as automobile tops have ribs which crack unwary skulls with every good bump. Riding in an airplane recalls learning to dive. The swimmer teeters on the end of the springboard, as all his experience warns him that his brains will be dashed out below. The first dive wipes out years of intuition, and after that the nervousness is gone. Instinct tells him that anything heavier than air surely will fall. The first flight changes all that—it doesn't—and after that flying seems quite natural.

A week later, over Florida and in an open plane, where talking was impossible, the pilot behind me would shake the plane as a cat does a mouse, whenever he wanted to attract my attention to pass up a note. A rough passage in the air was no more noticed than, and little different from, a storm at sea.

While we crossed the Argentine pampas and I was soundly sleeping, the plane made a sudden half loop and I awoke, lifted from my seat. Only a few feet below a bull was charging across the field, dignity thrown to the winds, head down and tail as straight as a flagpole. The herd was stampeding in all directions. The plane had come down through the clouds, made a playful dive, and now was going up again.

"That old bull saw the biggest bird he had ever dreamed of swooping down at him out of the clouds," the mechanic laughed. "For a minute he stood with all four feet braced apart, ready to charge as instinct told him. Then he changed his mind, swung in a flash, and tore across the field before the giant hawk could catch him."

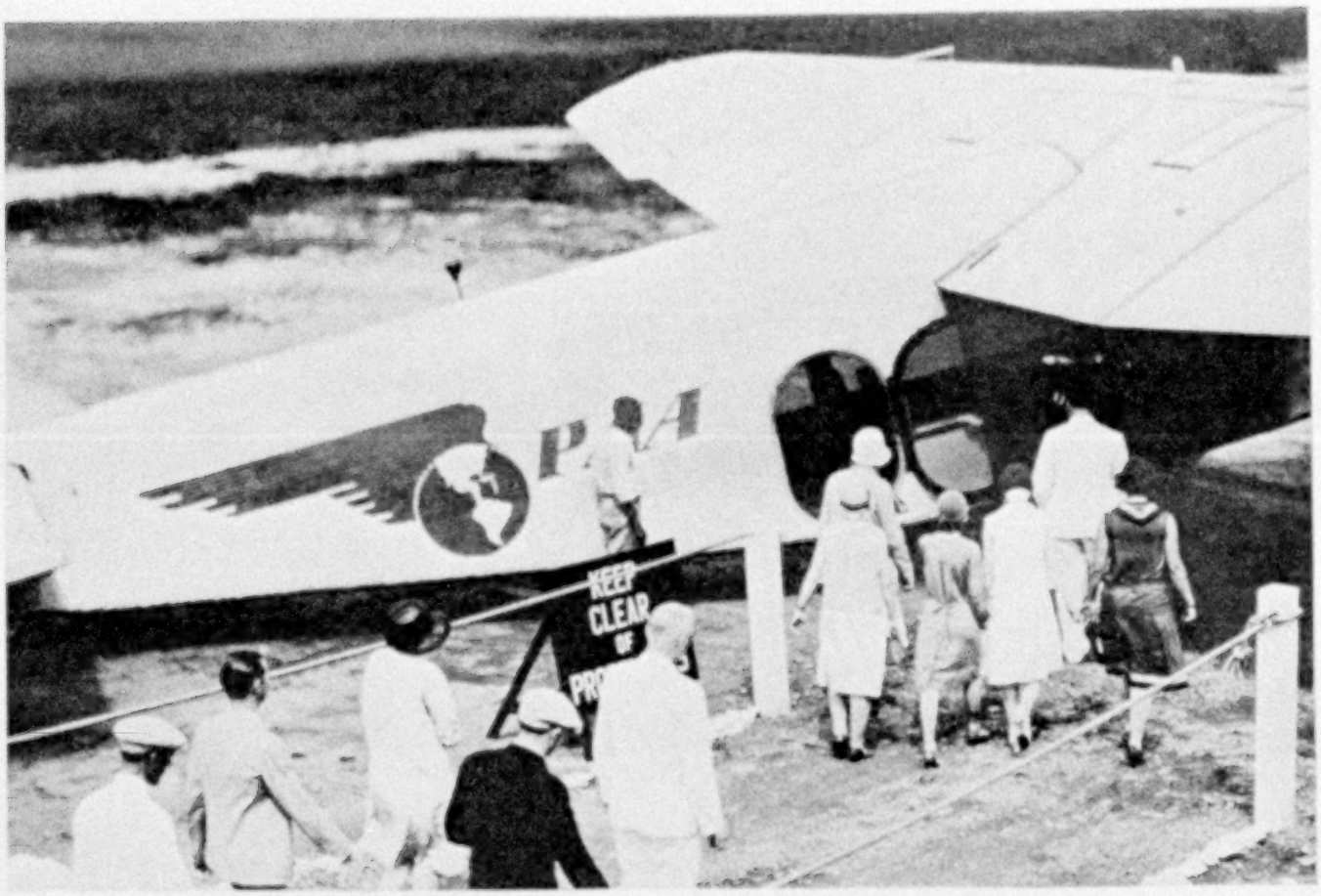
Using a 7-ton airplane to play tag with a bull may seem elephantine sport, but it shows how the big planes are responsive to the slightest control and how easily they can be handled. The stunt itself gives confidence.

The haze was breaking over the city when we got away to a late start the next morning, past the sumptuous Country Club, and a couple of minutes later we were out over the Pacific, passing Ancón. The pretty little village, with its green trees, stood out on a sandy plain against a background of black hills. White hangars of the Peruvian Navy were along the shore and three biplanes were on the water, another taking off with a wake of spray. Half the northern coast of Peru would be left behind before our next stop.

A four-master was off Chancay and irrigated fields behind, their adobe fences meandering in strange curves. Next, a wrecked steel hull, half buried in the sand, and, farther out, thousands of birds swimming on the ocean in fishing formation, looking like the bobbing floats of a Nantucket fleet.

It was market day in Huacho, bright with gay-colored dresses of women, loaded burros in the streets, and roofs of the same brown adobe as the walls.

* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "In the Wonderland of Peru," April, 1913, and "Further Explorations in the Land of the Incas," May, 1916, by Hiram Bingham.



Photograph from Pan-American Airways

AIR TRAVEL IS POPULAR IN THE CANAL ZONE

Passengers are embarking in one of the large airliners at Cristóbal, the Atlantic port of the Republic of Panama, adjoining the American city of Colón, eastern gateway to the canal.

Two piers converged in the Bay of Supe, a lighthouse on the rocky point, sugar mills and fields beyond. Another sugar mill at Paramonga, gray houses and an old fort on a hill (see page 299).

The plane bumped through patches of fog, close to a sheer rocky cliff, breakers at its feet, as uninviting for landing as the side of a 20-story building.

ROAD-BUILDING IN PERU IS A STUPENDOUS TASK

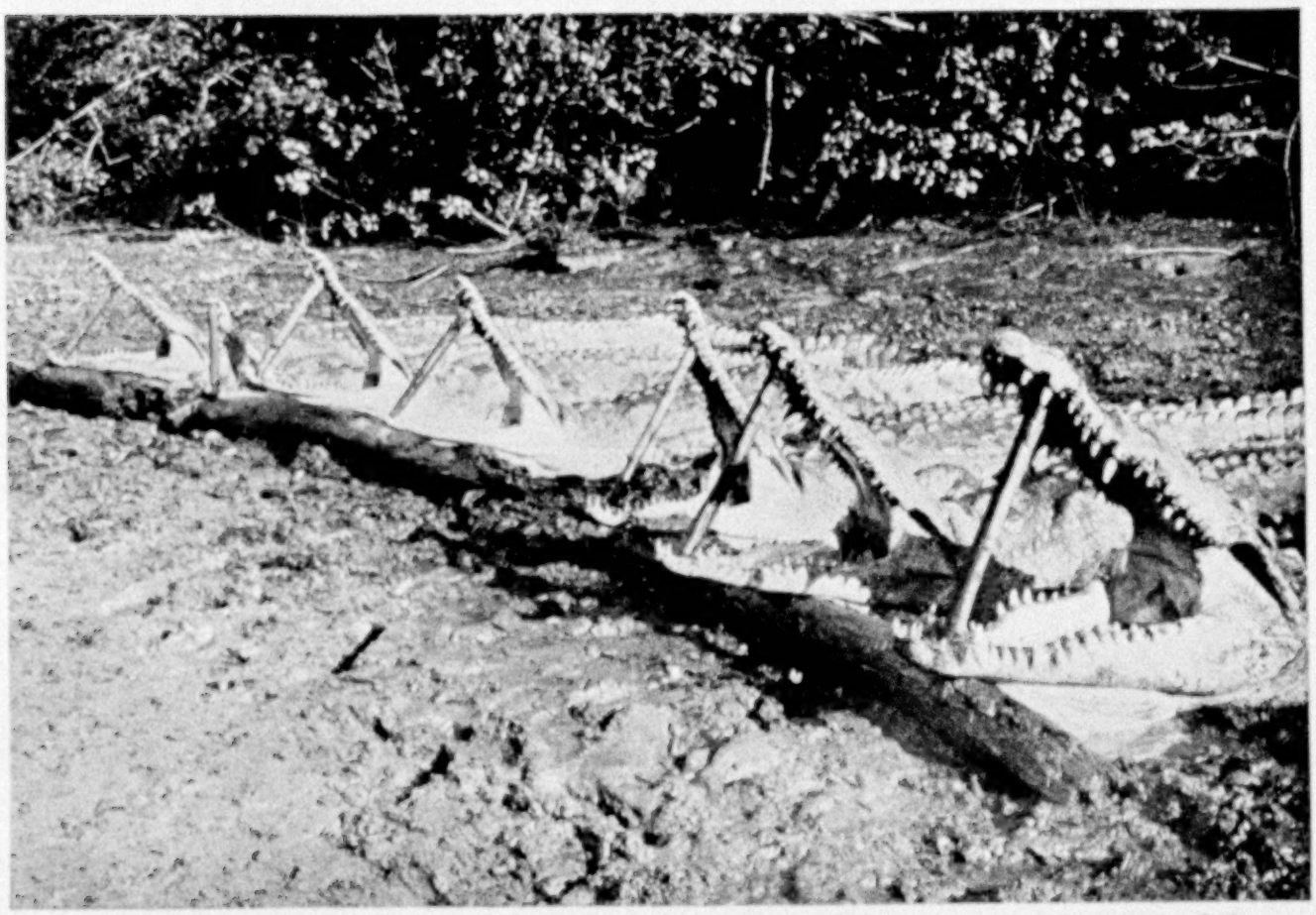
We cut back of a granite point, a spidery road around its side, to Samanco, and the sun broke through the clouds. Road-building is one of Peru's many improvement projects, and it is a stupendous task. One stretches along the coast, sometimes on the plateau, again blasting or tunneling through rock or skirting the edges of cliffs on floors of concrete.

Santa, with more salt-drying kilns and in a fertile river valley, dropped behind and another problem of road-building was below. Telegraph poles, fallen or awry, half-buried lines of straight white, what was once a highway, stretched across the big plain for miles, mute signs of man's losing fight against the drifting sand.

Two schooners, a five-master and a four-master, were a picture off Salaverry's long railroad pier. Five minutes later we were crossing an irrigated plain, keeping inland from the radio aërials and coming down on Trujillo's field, marked by a line of brush. Pizarro founded the city in 1535. If he had seen the mail plane drop out of the clouds to-day, he might have been more surprised than the Incas were when he rode in on a horse.

THE FORGOTTEN PASSENGER

Half an hour later we were gliding over Pacasmayo, the pilot digging out a sack of mail with one hand to drop without stopping. Pacasmayo was to get a one-way mail service, when suddenly, above the hum of the motor, insistent shouts were heard: "I must get off! I must get off!" This was the last remaining passenger's station and he had been forgotten. We bumped over the ground



Photograph from Ewing Galloway

ALLIGATORS AWAIT SKINNING ON A PANAMA RIVER BANK

Hides of these creatures find ready sale among manufacturers of leather goods, and great numbers of them are exported to the United States.

to a stop, he jumped nimbly through the door, and we in the air again, motor never stopping.

Another stretch of sandy plain without a sign of life; then over Eten, port for a hinterland rich in coffee and sugar; next, prosperous Chiclayo, and down at Pimentel, its watering place, a few miles beyond.

"Made 140 miles in that hour," said the pilot, as we flew over the same unvarying plain to Piura. Another half hour to Talara, and the derrick-sprinkled oil fields of Peru were in sight.

We landed on a field on a bluff. The versatile pilot took the wheel of an ancient automobile, and 10 minutes later we had bumped over a rough road and through Talara, smelling and stained with oil, to where an amphibian plane stood on the beach. While he warmed it up, a pleasant-faced young official accosted me. He wanted to see my passport, producing a rubber stamp which he felt an urge to use. No other request for a passport was made on the long trip. It was in my suitcase and I protested against getting it.

"But I'm not a dangerous character," I explained in unsafe Spanish, for an idea had come. Searching through a Lima newspaper, I pointed to a paragraph in the official bulletin of that day, recording that President Augusto B. Leguia had given me an audience after my arrival the previous afternoon. He read it carefully.

"Very good," he commented, handing it back with a courteous bow.

"Stamp the newspaper," I suggested.

"No; pleasant voyage," he laughed, and the plane was moving into the water.

ROUNDING THE WESTERNMOST POINT OF SOUTH AMERICA

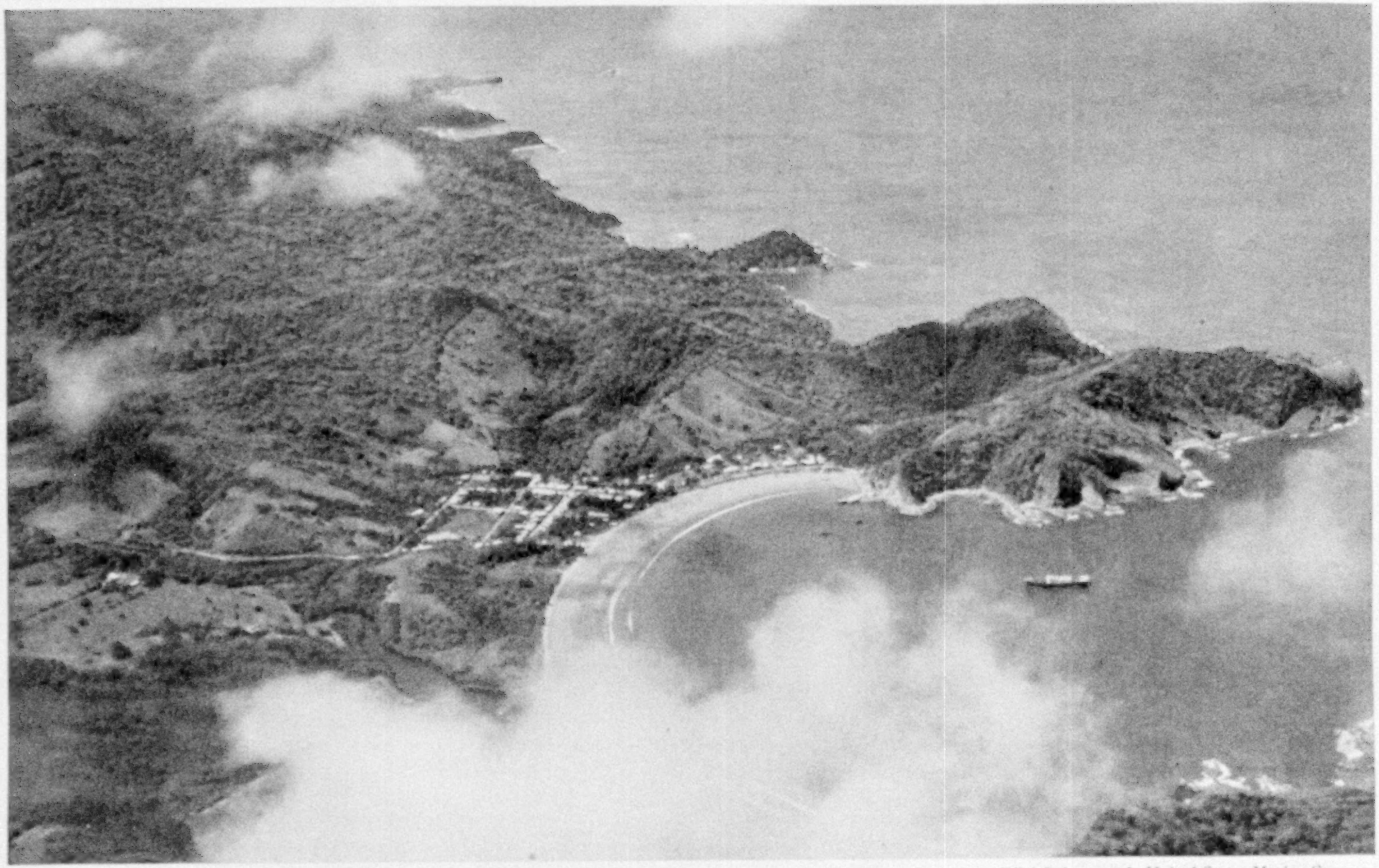
It scurried around the bay like a duck reluctant to leave. Then up, a sharp turn, and we were over the ocean, rounding the most westerly point of the continent. Oil tipples became few, the barren plateau disappeared, and trees came down to meet the shore.

Low marshes showed off to the left; hard to tell where ocean ended and the island-sprinkled Guayas River started.

Official photograph, United States Air Corps

COLONEL LINDBERGH PASSED OVER THIS AREA ON HIS PANAMA-COLOMBIA FLIGHT

With an escort from France Field, the *Spirit of St. Louis* is shown soaring above the Canal Zone, bearing America's "Ambassador of the Air" (see "To Bogotá and Back by Air," by Col. Charles A. Lindbergh, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1928).



Official photograph, United States Marine Corps

SAN JUAN DEL SUR WAS TO HAVE BEEN THE WESTERN EXIT OF A NICARAGUAN CANAL

The beach of this small town, not far from the border of Costa Rica, presents a perfect curve to the eye of the airman.

Photograph by Jacob Gayer

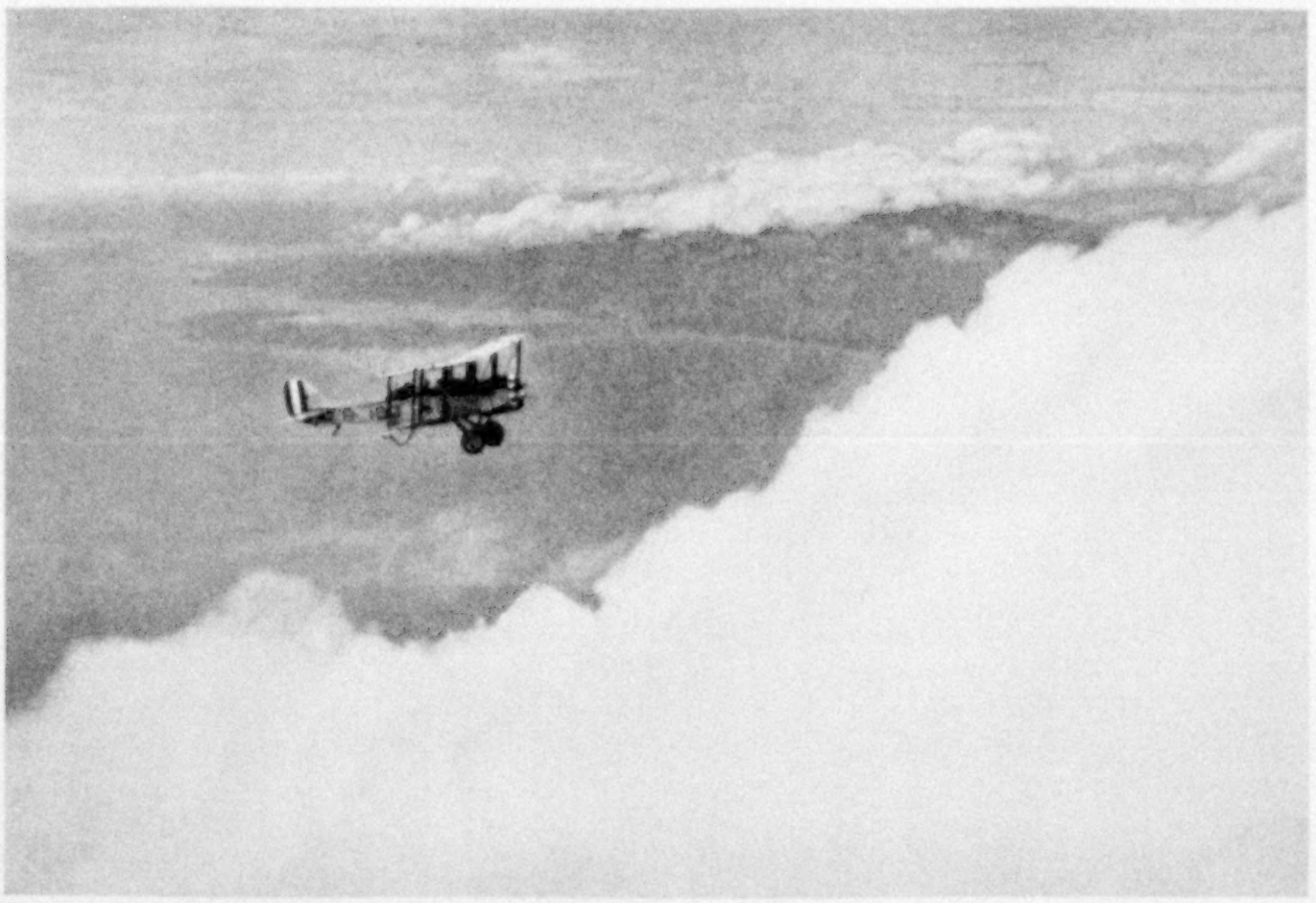
LAKE NICARAGUA MAY ONE DAY BE A PART OF A SECOND ISTHMIAN CANAL

Navigable throughout for large vessels, this inland fresh-water sea, 100 miles long and 45 miles wide, is connected with the Atlantic Ocean by the San Juan River and with Lake Managua by the Tipitapa River. The system is a waterway of great potential importance. At present it is used for carrying cattle and produce to east-coast markets. It is the largest body of fresh water between the Great Lakes and Lake Titicaca.

Photograph by Jacob Gayer

THE ROAD TO GRANADA LEADS THROUGH A FOREST WONDERLAND

With a climate tempered by the proximity of the Atlantic and Pacific oceans and by two mountain ranges, Nicaragua has many advantages over most tropical countries. The region about the isthmus separating Lakes Managua and Nicaragua is little above sea level and is covered with dense growth; yet, because of the porous tufa underlying the top soil, it is by no means unhealthful.



Official photograph, United States Marine Corps

CLOUDS HANG LOW OVER LAKE NICARAGUA

Rainfall in Nicaragua is more or less heavy during every month in the year and flying often means braving tropical downpours (see text, page 324). The prevailing winds are from the northeast and come laden with moisture from the Atlantic.

An ocean steamer coming down the river, long, narrow dugout canoes looking like toothpicks, sailboats, thatch-roofed houses on stilts, naked children playing at their doors, palms and bananas around the clearings—the Tropics had been reached.

Thatched roofs changed to tin; then came a couple of sawmills, brick houses with the secrets of inner courtyards bared, and we were over the plaza. Circling down around the latticed radio tower on a rock in the center of the river, we splashed to a stop in front of the imposing city hall of Guayaquil.

Ecuadorian hospitality was boundless and the evening was delightfully cool; but one thing they could not produce—a sight of Chimborazo's snowcapped peak, peer of Fujiyama and Osorno; it was too cloudy (see page 301).

Pablo Sidar, the Mexican good-will flyer, was just taking off on the last leg of his long trip around South America when we reached El Cóndor Field, where another amphibian was waiting the next morning. He did not complete it that day. The rain was too much, and ours was the only plane of three which started for Buenaventura that got through before night. Flickers of sunshine tipped our wings and were gone, and the showers, which increased to a steady downpour before afternoon, started as soon as we were over the ocean.

We skimmed close to the water between a rocky islet and a point, on across the bay and around Cape San Lorenzo, curving in over Manta, where women in bright-colored dresses on the steps of its old stone church suggested a fiesta or wedding. The plane staggered on and met sunshine again as Jama River showed in a thin white line on the hills.

CROSSING THE EQUATOR

"Where's the Equator?" I asked, for it was somewhere hereabout. The pilot, a former Navy officer, looked at his charts and figured.

"We'll be there at 9:33," he promised.

"Crossing the big line now," a note came back a few minutes later. A low

Photograph by Jacob Gayer

AN UNWILLING PASSENGER FROM CHONTALES PROVINCE STARTS FOR GRANADA

Nicaragua has great possibilities as a stock-raising country, and steps are being taken to replace the half-wild cattle that roam the ranges with animals of more marketable quality.

bluff came down to the shore, forest-covered hills and a valley beyond, but not a signpost in sight to mark where seasons and hemispheres change.

We flew by compass, a straight course, sometimes far out to sea and again bumping over land in the fitful storms, inside of Cape San Francisco, with thatched houses and palms in a valley; past Galera Light; more jungle as lonesome as the sea; a curve downward to wave at a town, and then down at Tumaco, an island in the river, for gasoline and the formalities of entering Colombia. Dugout canoes clustered around the raft, but the little city drowsed on shore.

"Any iguana here?" I asked one of the sight-seers.

"Up there," he replied with a broad grin, pursing his lips in memory of that palatable lizard.

ONE OF THE WETTEST CITIES IN SOUTH AMERICA

Showers and sunshine alternated through the afternoon. Swollen brown rivers stained the emerald sea; waves close below, flattened by the rain and dropping behind the flying plane like a mill race—the pilot said they were only 15 feet; black clouds ahead, bucking and quivering into another storm; then a break of sunshine, until finally, down on the river above Buenaventura, Pacific port of Colombia and one of the wettest cities in South America (see page 304). The amphibian inhabitants scorn either umbrellas or waterproofs; rain and sunshine are alike to them, and the local Pluvius registered 362 inches last year.

Clouds showed light below the peaks in the east when we took off the next morning; passed Chirambira lighthouse half an hour later, and then straight across 400 miles of water toward Panama City, most of the time driving blind through bursts of tropical deluge.

We came out in the sunshine, with Las Perlas Islands close on our right, a fleeting glimpse of the United States Navy submarine squadron from Coco Solo maneuvering under the water; then pineapple-covered Taboga, where the Spaniards came after Sir Henry Morgan

Photograph from Pan-American Airways

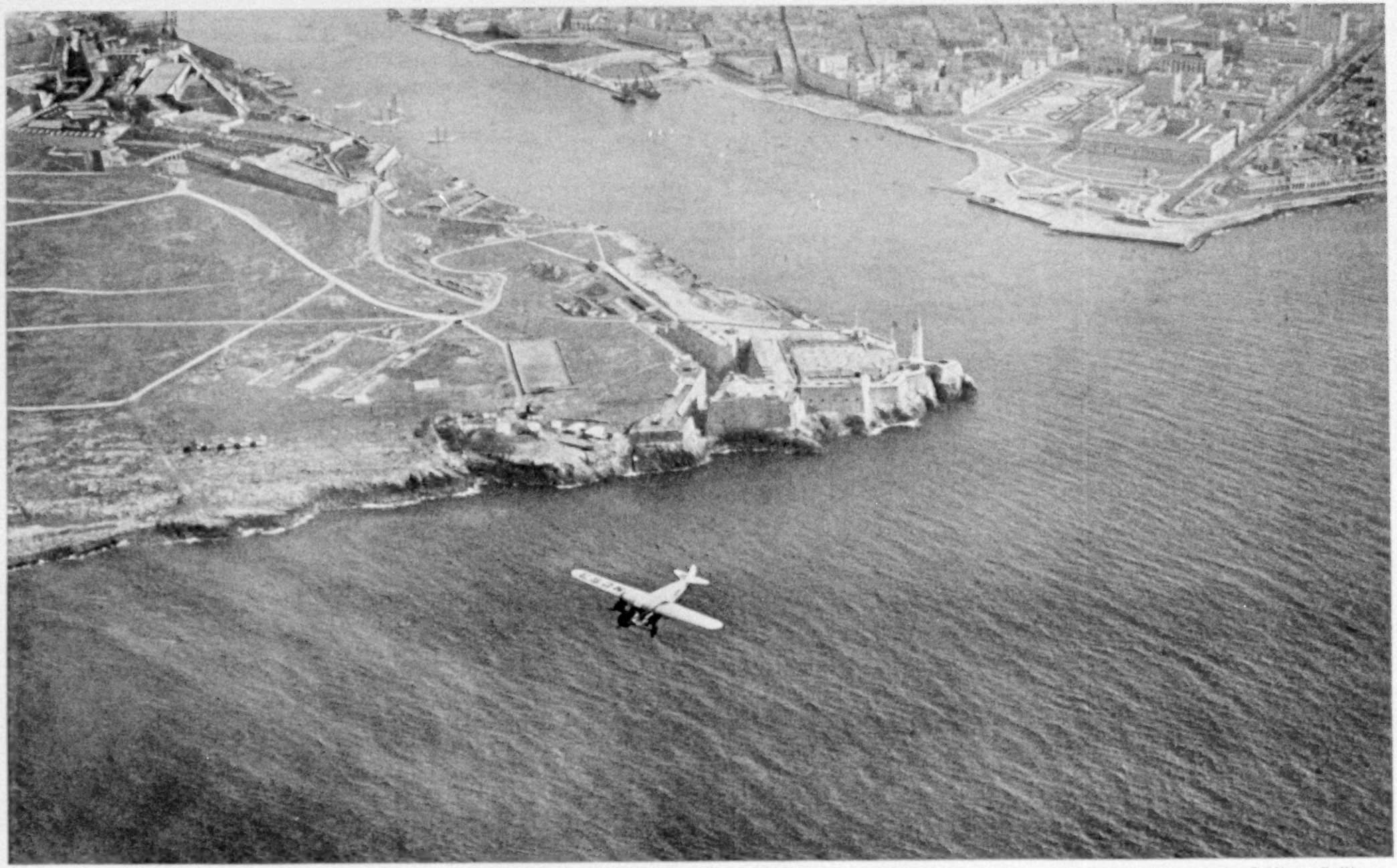
MANAGUA THRIVES BESIDE AN EXTINCT VOLCANO

The capital city of Nicaragua is situated on the shores of Lake Managua, in pleasant natural surroundings. On the left rim of the crater, in the foreground, is Fort La Loma.

Photograph by Victor Dallin

THE NEW CUBAN CAPITOL IS A PALACE OF GRANDEUR

Tinted marble and glass lend a touch of warmth and color to this magnificent Government building in Havana. The edifice, erected at a cost of more than $17,000,000, is a fitting expression of the spirit of this Latin American republic.



© Victor Dallin

FROM HAVANA TO KEY WEST IS NOW A 70-MINUTE FLIGHT

Trimotored airliners have cut the time between the Cuban capital and the United States by more than six hours. On the point of land which the plane has just passed stands historic Morro Castle.

Photograph from Pan-American Airways by Richard B. Hoit

HISTORIC NASSAU HARBOR IS ONLY A SHORT FLIGHT EAST OF MIAMI (SEE ILLUSTRATION, PAGE 322)

The weekly air-mail service now in operation down the west coast of South America to the Uruguayan and Argentine capitals cuts from four days to a week from the ordinary ocean-traveling time of a letter to those points from New York or Washington. A piece of mail dispatched from either city on Thursday evening will reach Buenos Aires or Montevideo a week from the following Monday, just eleven days later. An even greater saving of time is effected between the United States and many Central American cities. For example, twelve days are required for a letter to travel by steamer from New York to Managua, Nicaragua, whereas the air mail transports it in three.

Photograph from Pan-American Airways

AIR PASSENGERS ARRIVING AT MIAMI

The Florida city is linked to Havana and Nassau by regular passenger airlines. A daily air-mail service is also maintained between the south Florida metropolis and the capital city of Cuba, negotiating the 261 intervening miles in two and a quarter hours.

sacked Old Panama; then ahead, ships passing through a black curtain of rain over the entrance to the canal.

Big-gun pits at the bases and aircraft guns stood out on the tops of the three banglelike islands at the end of the long causeway. We entered the canal at Balboa, passing Panama City and Ancón, for the Army's navigation rules for ships of the air are the same as for those of the sea.

Toy ships and locks on a ribbon of water stretched below. It curved through Culebra Cut, the only break in the Continental Divide; past the Chagres, vomiting brown from the hills, and then Gatun Lake, with ghostly branches of dead forests sticking above its surface and in the center the United States Government's haven for wild animals, on Barro Colorado Island.* Gamboa penitentiary, the model infantry barracks of Fort Davis, the golf course on the shore and dozens of dugout *cayucos,* piled high with bananas, converged across the surface toward the railroad and a quick trip to the United States.

*See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Who Treads Our Trails? A Camera Trapper Describes His Experiences on an Island in the Canal Zone," by Frank M. Chapman, September, 1927.

FROM SPRING TO FALL IN SIX DAYS

Three of the Gatun spillway gates were open, the tropical rainy season was in full swing, and it started again as we came down on France Field at Cristóbal. We left the Atlantic side of South America in a springtime thunderstorm and six days later were back on the Atlantic side of North America in an autumn cloud-burst!

The next day was the same and the big trimotored plane went down the Pacific side, back and forth across the narrow isthmus of continent five times, finally alighting on the Panama Government field at Panama City, only 50 miles farther along the course, after a vain attempt to get through the rain.

Sunday was better, and close to 1,200 miles were covered in more than 10 hours'

Photograph from Pan-American Airways

MODERN AIRLINERS OFFER CLUB-CAR SERVICE

Passengers on this large plane, which is operated between Havana and Miami, have only to call the steward when they wish refreshments. Luxuriously appointed, the cabin affords comfortable accommodations for eight persons.

flying before the long day was finished—two days' flight in one and again on schedule. The plane headed west, along the southern coast of Panama, windows open, pilots in shirt sleeves and bareheaded, much different from Sunday a week ago.

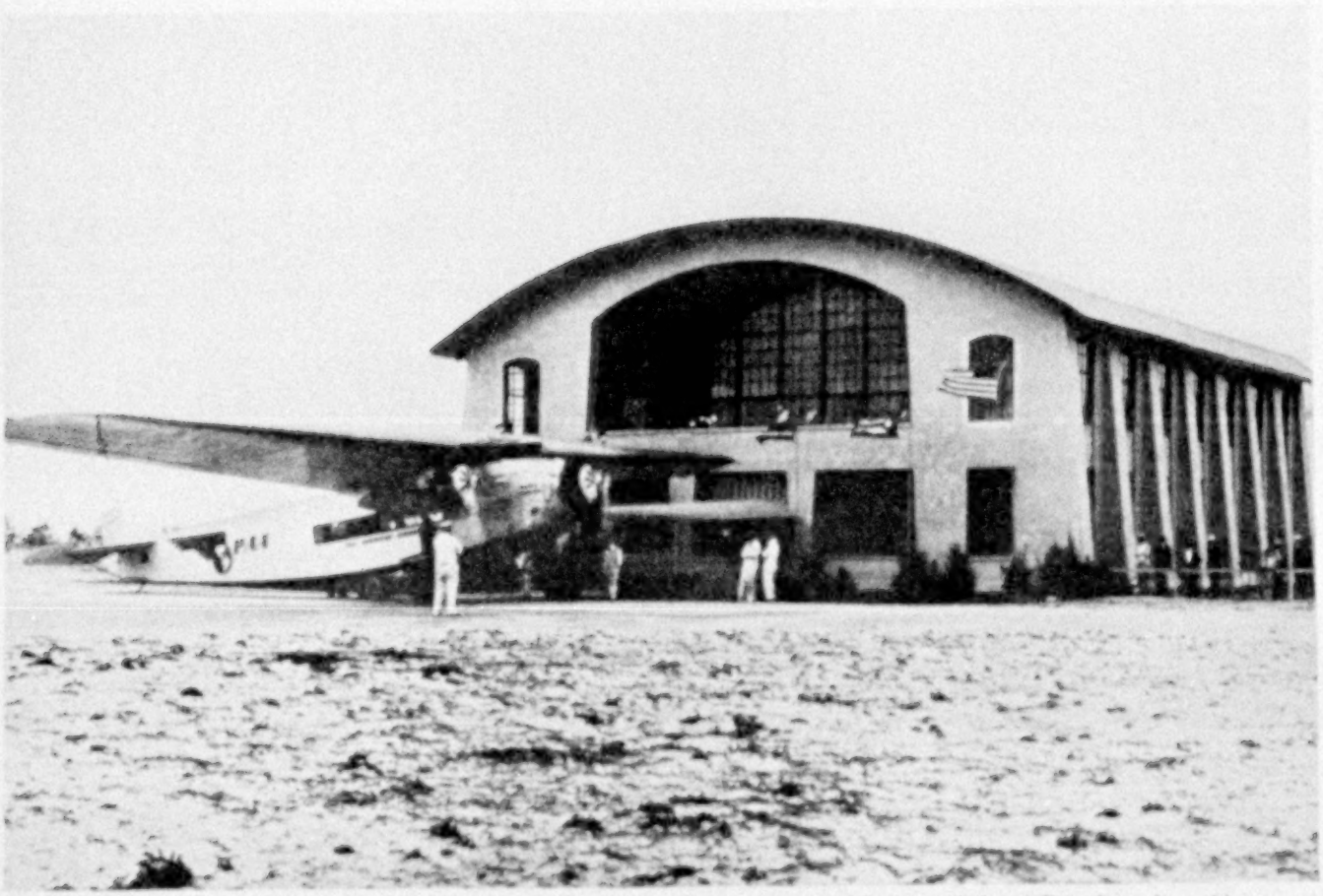
Another plane flashed by, mail going south, just as on that previous Sunday. Two Army planes, with Patrick J. Hurley, then Assistant and now Secretary of War, escorted us for 225 miles, to David, over the panorama of cultivated valleys and rivers, wooded hills and waterfalls. Managua, Nicaragua, was twice as far, and we went on.

INTO NICARAGUA

Costa Rica unrolled below an almost continuous forest, flitting red specks of macaws above the green carpet, always flying in pairs; gashes of red loam on the tree-covered hills; fields of sugar on the plain, and off in the haze, to the left, a white line, where the Pacific broke on the sand. Puntarenas, vastly different from its namesake in the frigid south, stuck into the sea on a spit of sand, and a sack of mail was dropped without stopping. Liberia was off to the left, and then Lake Nicaragua, with Solentiname Islands, black blotches on its smooth surface, and San Juan River a distant brown line.

Our course was straight across the lake for 70 miles, chasing a moving rainbow just ahead of the whirling propellers. The ridge between lake and ocean narrowed at Salinas Bay, where the United States may some day cut another canal across the continent (see pp. 313-317).

Ometepe and Madera were two squat volcanoes on an island in Lake Nicaragua, and a few minutes later we were at Granada, on shore. It is the terminal of a railroad and has a big church with a stretch of sidewalk varying the muddy roads. A canoe paddling near one of the red-tiled island homes was the only sign of life on the broad lake. It may not be as inviting as it appears from above, for it is credited with the only fresh-water sharks in the world.



Photograph from Pan-American Airways

THE GIANT BIRD MAKES READY TO LEAVE MIAMI AIRPORT

Had the author wished, he might have boarded an outgoing airliner upon his arrival in Florida and started back over the long route he had just covered. There is regular service between the United States and Montevideo.

We dropped down in the rain outside of Managua, on Lake Managua's shores. Twenty minutes later, in another plane, we were headed again toward the Caribbean and the Atlantic, driving into a cloudburst, drops pelting the windshield like bullets and the fish-skin coat of the pilot a bulging balloon in the gale.

An automatic and a belt of cartridges were strapped around his waist and a rifle leaned against the back of his seat. A forced landing might be made and they would help to protect lives as well as mail, for Nicaragua is not too safe along its borders.

A radio operator, key clamped to his leg and earpieces on his head, was clicking off requests for weather reports, more important than bandits. Then the sun came out for a minute.

A VOLCANO BELT FROM THE AIR

We were in the volcano belt, some still active and others long sleeping with little lakes in their craters, diamonds in a setting of green. On clear days many of them can be seen stretching toward Salvador, including Momotombo, Las Pilas, El Viejo, and, far in the distance, Cosegüina, guardian of the Gulf of Fonseca. The cordillera was ahead, hidden in the clouds, and the nose of the plane turned suddenly upward.

A gorgeous red, blue, and yellow macaw, which had been standing on one foot and trying to pick the labels off a suitcase, skidded with an indignant squawk. The pilot, who was chaperoning it to his son in Miami, had introduced it as Billy and very intelligent. On every occasion Billy shrieked "Ten o'clock!" in a raucous croak. The pilot explained that was breakfast time. It meant nothing in a plane over Honduras.

The rain had started again and we were circling for altitude: 4,000 feet, and the white clouds stretched below with more ahead and above; a blind climb through them might mean a crash into the mountains; 6,000 feet, and jagged mountain tops showed through fuzzy white, as we circled out again; 7,000, and the sun

tipped the wings; 9,000, a gap of blue sky above the mountains ahead, and then 9,500, and we were over the ridge, mountains crossed for the last time, the Pacific left behind.

Tegucigalpa, capital of Honduras, lay behind, under the clouds, and we were in the sunshine, flying lower, over a picture valley of fields and forests, winding roads, brown villages, and little white cities.

The pilot handed back a NATIONAL GEOGRAPHIC MAGAZINE map, his navigation chart. It located La Paz; two white churches on a plaza and roads winding into the bosque. Comayagua was ahead, a big white church and water tower on its plaza and straight lines of low white houses along its wet, red streets.

Lake Yojoa lay in a cushion of green, soft and alluring, far different from the harsh, barren southern coast, but here a crash meant certain death, while there a landing was possible—the siren lure of the Tropics.

The jungle changed to bananas, millions of trees in regular-shaped fields, the pilot said 30,000 acres, and more being planted, the plantation of an American banana company; a town called Progreso, a railroad running to the near-by coast, and rain-blackened houses of workers in clusters along the tracks.

Tela, midway between Ceiba and the Guatemala border, is too small to be on many maps, and the entire population, starched skirts limp in the rain, must have been out for the Sunday races when we came down outside the track. Half a dozen faces were white, all were happy, but darkness was falling before we could get away.

OVER THE CARIBBEAN

The course was straight over the Caribbean to Belize, British Honduras, a bird winging homeward at night, racing with the setting sun. It hung for a moment, a red ball tinting the sea into a blazing plain; another minute and the skies were painted red behind the coast; then shades of water, land, and clouds merged into one deep black, and the quick tropical night had come. A tiny light was in the radio coop, but the pilot shouted to turn that out.

A glow showed in the darkness ahead, Belize rising to a blotch of white, as we sped over the curving horizon. It separated into a myriad of lights, a searchlight playing on the little landing harbor. That snapped out as we came down with a splash, taxied over the water and up on to the ramp.

A minute for beer at the British Club, then supper, and early to bed at the aviation company's quarters. It had been a hard day.

Another day was breaking as we sped north off the coast of Yucatan, dipping a reply to the lighthouse tender's four youngsters waving a greeting on Point Herrero; then over prim little San Miguel Cozumel, on Cozumel Island, and down on the seaward side.

While the keeper filled the amphibian with gasoline and oil, we disposed of his beans, "corned willie," and coffee. He has nothing to do but fish until another plane tarries for a few minutes to-morrow.

An hour and a half later the Strait of Yucatan had been crossed, Cape San Antonio, westernmost tip of Cuba, was off to the right, and we were passing Point Cajón, tip of the island boot.

We skimmed along the northern coast, over the mouths of Bahia Honda and Cabañas Bay, ships in the harbors, little towns and winding roads; St. Lucia, with the name painted on a roof, disclosing its identity; fields of sugar and tobacco, trees on the hillsides, smoke from tall stacks and from burning fields, and then, two hours later, a golf green, towering hotels and clubs, and we were over Havana and coming down on a flag-decked field.

The strait sparkled in the sun through the hour we crossed to the Florida Keys. The ferry passed midway. We skirted the railroad, over busy little towns and pleasant bungalows, empty checkerboards of subdivisions with unused pavements and posts without lights, squares of orchards and acres of water-covered plains. Monday, 3:55 p. m., we were splashing down on the field at Miami. "Sparks" climbed stiffly out of his coop.

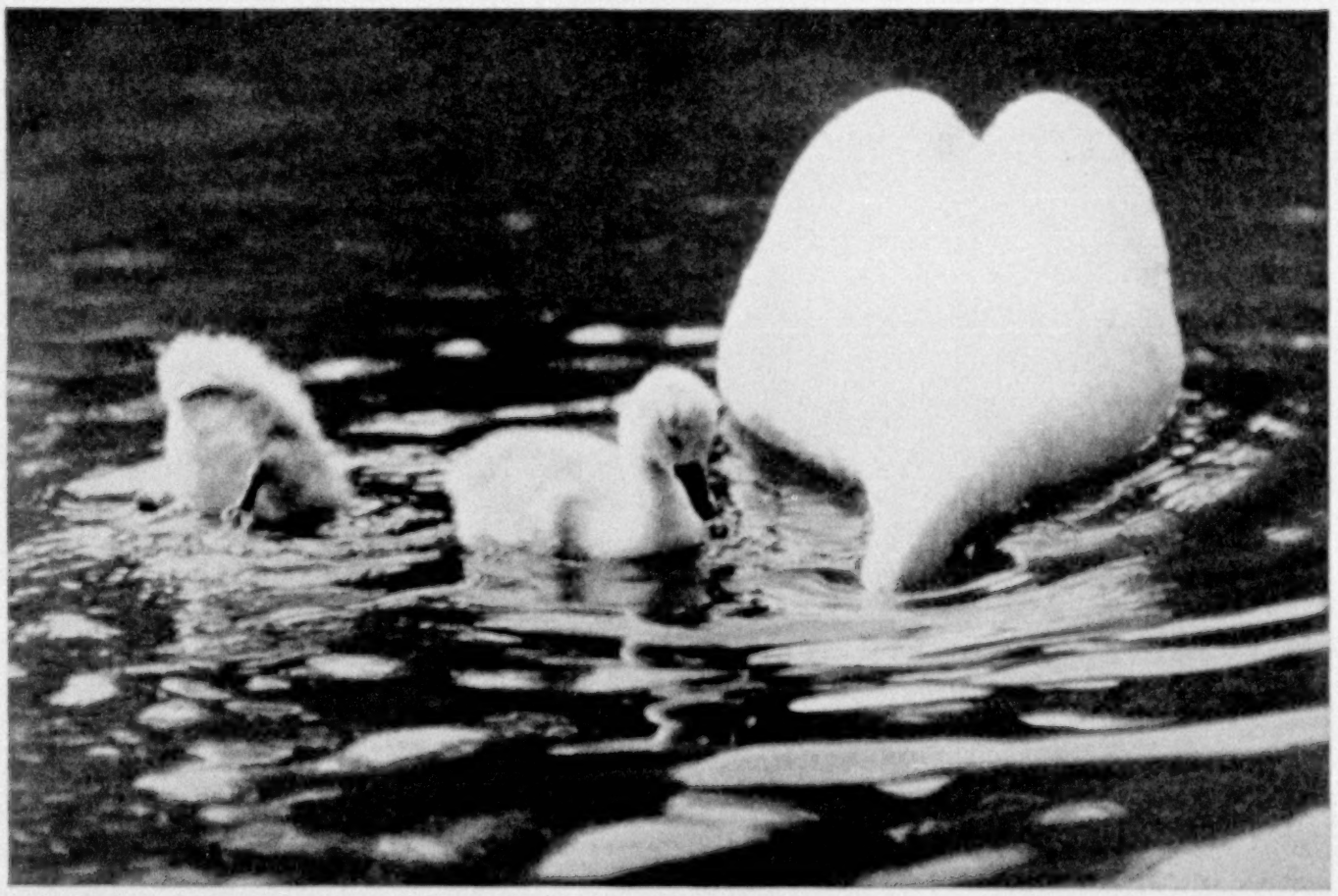
"Florida's all wet," he opined, and I included the rest of the world.

"Any liquor in your suitcase?" the customs man asked. Florida is also dry.

"Not at $1 a pound excess baggage," I explained.

POETS HAVE SUNG OF THE GRACE AND BEAUTY OF THE STATELY SWAN

Its snow-white plumage, "arched neck," and "oary feet" make it an ornamental bird with few rivals in public and private parks. Costly, unprolific, few are bred in the United States, English importations largely maintaining the supply. In early England the swan was regarded as a "bird royal" and only persons of high station were permitted by the Crown to own it.



Photographs by Lynwood M. Chace

"WATCH MOTHER CLOSELY AND DO AS SHE DOES"

Baby swans are adept pupils. They must be, for a large part of their food is obtained from under the water. In early England the young, or cygnets, were highly esteemed for the table.

FOWLS OF FOREST AND STREAM TAMED BY MAN

By Morley A. Jull, Ph. D.

Senior Poultry Husbandman, Bureau of Animal Industry, United States Department of Agriculture

Author of "Races of Domestic Fowl," in the National Geographic Magazine

MAN'S interest in the wild bird life of the forest, jungle, lake, and river is made manifest by the large number of wild species he has domesticated. His captives have yielded flesh and feathers and in some cases eggs, and the more beautiful ones, with their graceful forms or wonderful combination of plumage colors, have long been a source of esthetic pleasure.

Probably the earliest attempts at domestication were of the geese and the ducks, although the jungle fowl was reclaimed in very early times, relatively speaking. The turkey, peafowl, and guinea fowl have been recent additions to the list. The swan has been tamed most recently of all.

Of the six groups of birds discussed in this article, there are three land birds—the turkey, peafowl, and guinea fowl—and three waterfowl—duck, goose, and swan.

BILLS AND BODIES DISTINGUISH LAND FROM WATERFOWL

There is a marked difference between land birds and waterfowl. Land birds have beaks for picking up particles of food from the land, while waterfowl have bills, the upper and lower mandibles of which are equipped with toothlike projections alternating and fitting within each other along the edges of the mandibles. This arrangement enables waterfowl to strain water from the food which is frequently obtained under water.

Land birds have claws adapted for scratching purposes, whereas waterfowl have webbed feet and "boat-shaped" bodies adapted for swimming.

The numerous races of chicken that have descended from the jungle fowl have been described in a previous article in the National Geographic Magazine.*

Domestic fowl, peafowl, and guinea fowl are more or less closely related, a fact borne out by the results obtained in crossing the domestic fowl with the peafowl, the peafowl with the guinea fowl, and the domestic fowl with the guinea fowl. All hybrids obtained from these various crossings, however, are sterile. In so far as known, the turkey has never been successfully crossed with any of the others.

The swans are easily distinguished from the ducks and geese by their long, slender necks and by the space between the eye and bill, which is bare of feathers. It is interesting to note, however, that most naturalists have failed to mention the fact that the Muscovy duck also has the space between the eye and bill bare of feathers.

In ducks the first plumage of the young very closely resembles the adult female in those cases where the adult male and female differ in color, whereas in geese the young do not differ materially in plumage color from that of the adult male and female, which are alike in color for each species.

In ducks the males molt their small feathers twice in twelve months, whereas geese molt but once in the same time. The males in all ducks, except the Muscovy, have two distinctly curved sex feathers at the base of the tail, a character absent in all geese. The voices of ducks and geese differ materially.

Geese and swans are inclined to be monogamous in their sexual relations, while ducks are polygamous in the extreme.

Crosses have been reported between the domestic goose and the Muscovy duck, the Egyptian goose and the wild duck, and between the swan and the goose. By some naturalists the Muscovy duck is regarded as a hybrid between a species of wild duck and a species of wild goose.

THE PEAFOWL

(For illustration, see Color Plate I)

The most gorgeous of all the feathered tribe of forest and jungle is the peafowl, a close relative of the pheasants and the jungle fowl.

* See "Races of Domestic Fowl," by M. A. Jull, in the National Geographic Magazine for April, 1927.

The peafowl is at home in the dry lower regions of India, Burma, Siam, Java, Ceylon, and the Malay Peninsula. It has not migrated extensively of its own accord, but it has been taken to many parts of the world as a bird of ornament, and thrives in many climes and under a variety of conditions.

The wild peafowl has a varied diet, including fruit, grain, berries, insects, and sprouting buds of many bushes, and it feeds for the most part in open spaces. Snakes are reported to be especially appetizing to it, and it is supposed to be a deadly enemy of reptiles in general.

By night the birds roost securely on the high branches of isolated trees. The cock may roost alone or with his harem, which may number up to five females.

There are two species, the Indian peafowl, *Pavo cristatus,* and the Green peafowl, *Pavo muticus,* the former being the more widely distributed. Seldom is the Green peafowl encountered outside of its native habitat. There is a White peafowl, very beautiful indeed against a green background, but this variety is probably a "sport" from the Indian species.

The sexes differ considerably in plumage, the female Indian peafowl being more somberly colored, in keeping with almost all species of wild fowl.

The peafowl has been a resident of its native haunts for thousands of years, but the Biblical references in I Kings, X, 22, and II Chronicles, IX, 21, constitute perhaps the first mention of the peacock outside of India. It has been familiar to mankind outside the Orient since the Phœnicians brought it from India to the Pharaohs of Egypt.

Aristotle states that Alexander introduced the peafowl into Greece. In the fourteenth century it was to be found in France, Germany, and England.

THE PEACOCK A SYMBOL OF IMMORTALITY

The early Christians adopted the peafowl as a symbol of immortality, and in France and elsewhere, in the Middle Ages, the "Vow of the Peacock" was pronounced at table with the hand held extended over a peacock roasted in his feathers. Thus did each knight proclaim the formula: "I vow to God, to the Virgin Saint, to the Ladies, and to the Peacock," to carry out a certain objective.

In countries where the peafowl was not regarded as sacred, it was often served to guests. The Roman Emperor Vitellius is supposed to have regaled his friends with platters of tongues and brains of the bird.

In the Middle Ages roasted peacock was served at banquets given by English barons, this custom serving as evidence of their wealth. On the other hand, Mohammedans in the Malay States regard the peafowl as unclean, since it is supposed to have "guided the serpent to the Tree of Knowledge in the Garden of Eden," and consequently is living under an eternal curse.

The plumes of peacocks were formerly employed as ornaments on helmets, and in China "eyed feathers have long been used as an order granted as reward of merit to mandarins." Marie Antoinette liked peacock plumes for ornamentation. In different parts of the world they are used for decorating fans and hand screens. India exports considerable numbers of the plumes.

DUCKS

The breeding of ducks has been an important enterprise in many countries for several centuries. For the most part, they are raised exclusively for their meat, but in recent years a certain amount of interest has centered on duck-egg production.

That duck meat has been esteemed by man since the dawn of the human race is attested by the discovery of duck bones among the remains of troglodytes of the Stone Age. Drawings on Egyptian monuments dating from 3000 B. C. to 1000 B. C. represent ducks being caught in nets and being killed by boomerangs.

The best evidence available points to the conclusion that, with the exception of the Muscovy, the wild Mallard duck, *Anas boschas,* is the ancestor of all domestic breeds.*

Undoubtedly the Mallard was domesticated at a very early time, for the Roman writer Varro (110–27 B. C.) describes the procedure to be followed in keeping ducks confined within an inclosure. For many centuries the Chinese have had an extensive duck industry, and

* See, also, "American Game Birds," by Henry W. Henshaw, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1915.

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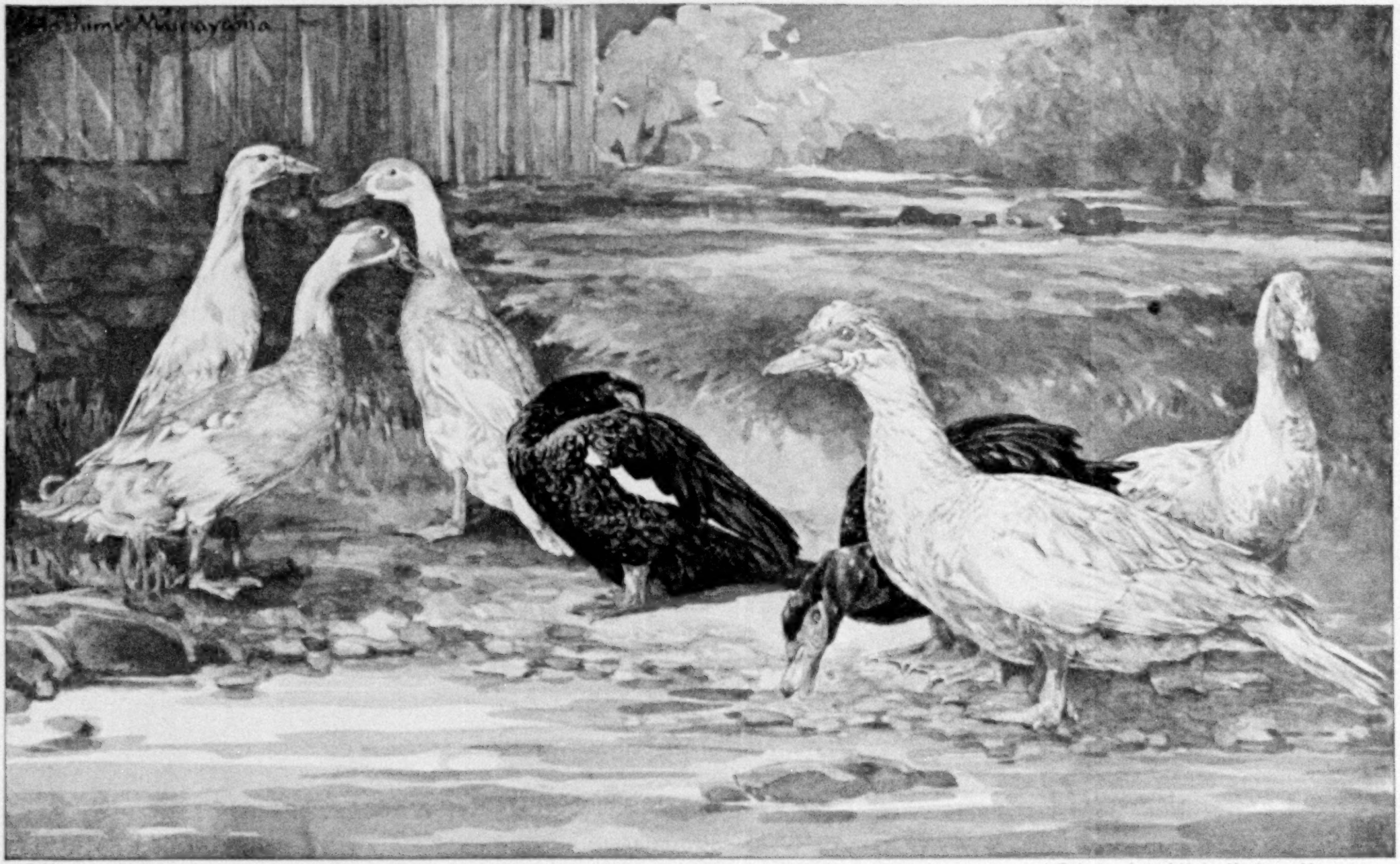
INDIAN AND WHITE PEAFOWLS

The peafowl is one of the most gloriously colored birds in all feathered creation. Of the two wild species, the Indian and the Green, the former (the peacock and peahen shown in the foreground) is the one usually seen in captivity. The White variety probably came from matings of domesticated colored birds, since there appear to be no wild Whites. The beauty of any landscape setting is greatly enhanced by the presence of a proud peacock.



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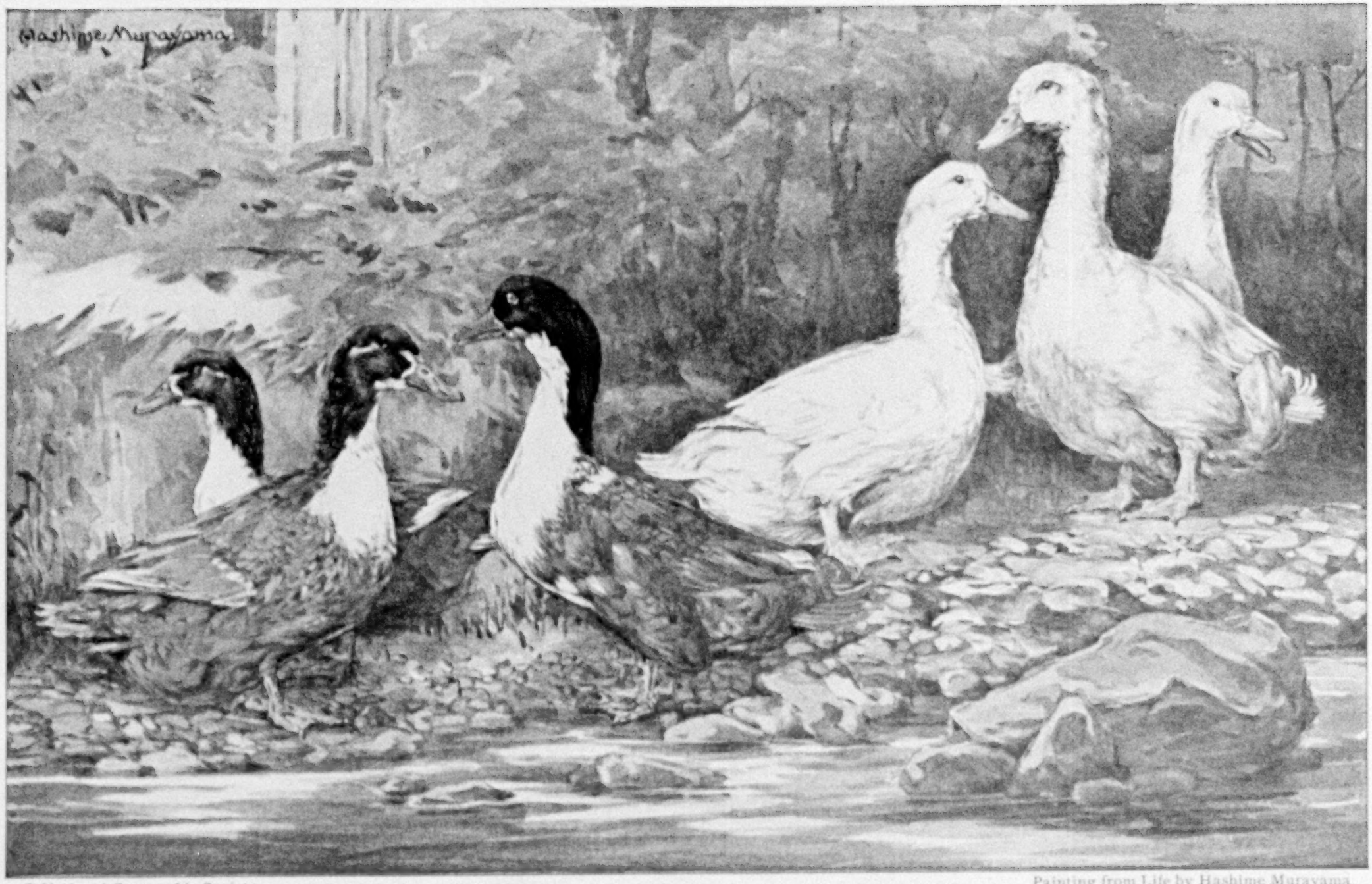
WHITE RUNNER, FAWN AND WHITE RUNNER, COLORED AND WHITE MUSCOVY DUCKS

The White and the Fawn and White Runners (three, upper left) are two of three varieties of the "egg-laying" domestic breeds of ducks. The Muscovy (four, lower right) is different from all other breeds in that the female has no "quack" and both sexes are inclined to roost in trees. The Muscovy drake has no curled sex feathers at the base of the tail, a character common to all other drakes.



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BLUE SWEDISH AND AYLESBURY DUCKS

The Blue Swedish duck (three, lower left) apparently owes its origin to German ancestry. The Aylesbury (three, upper right) is the most popular meat duck in England.

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CRESTED WHITE AND ROUEN DUCKS

The Crested White duck is a novelty, the crest being the most distinguishing feature of the variety. The Rouen (male, center, and two females) is supposed to be descended more or less directly from the wild mallard duck and has the same general color pattern.

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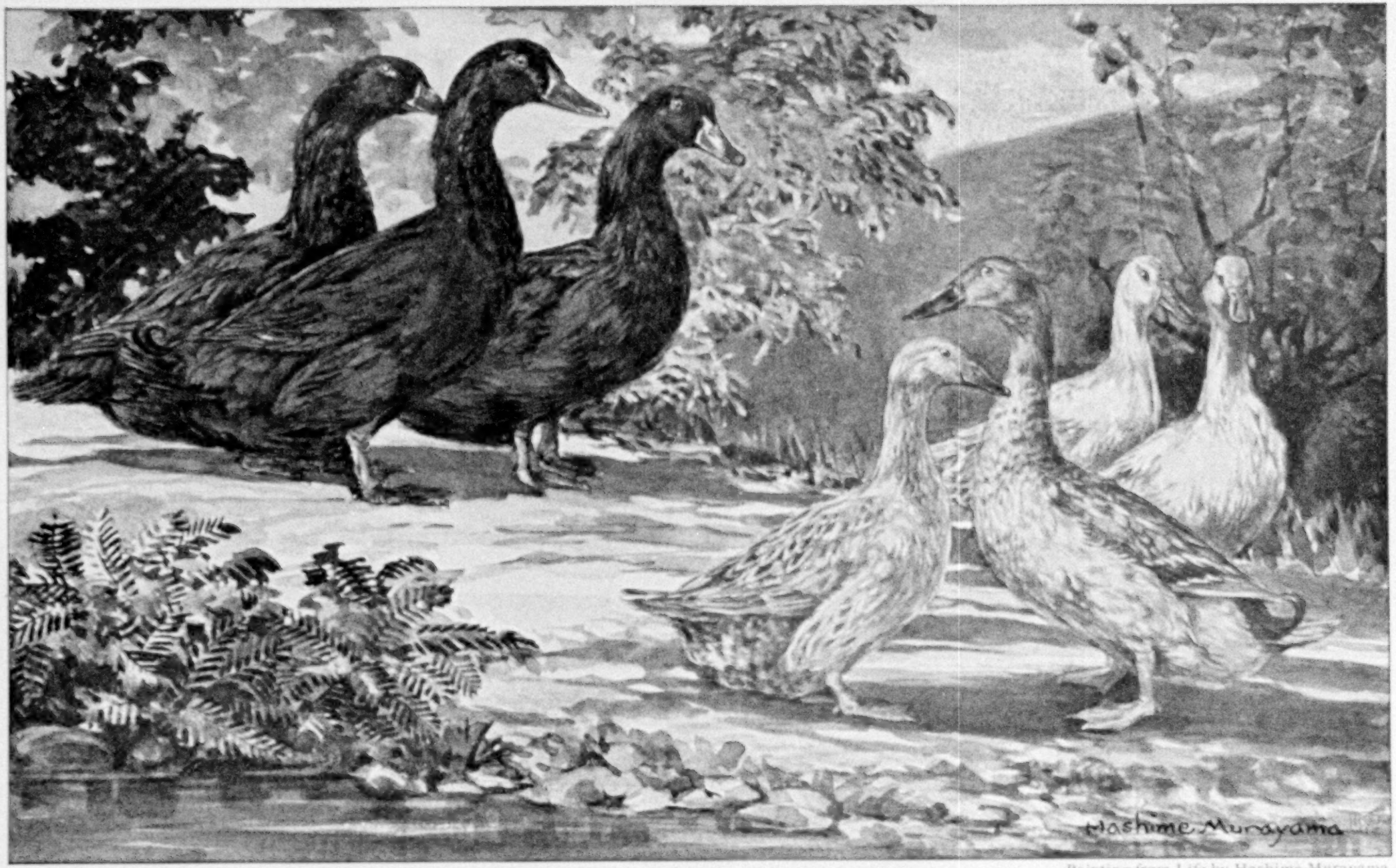
BLACK EAST INDIA AND PEKIN DUCKS

The Black East India duck bears a close resemblance in miniature to the Cayuga (see Color Plate VI). The Black East India is bred for its small size. The creamy-white Pekin is a standard variety in America and is bred extensively for market purposes.



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CAYUGA AND KHAKI CAMPBELL DUCKS

The Cayuga (upper left) is the black breed of the domesticated ducks. The Khaki Campbell (lower right) is of English origin and has been bred extensively for egg production. It is somewhat smaller than the Cayuga.

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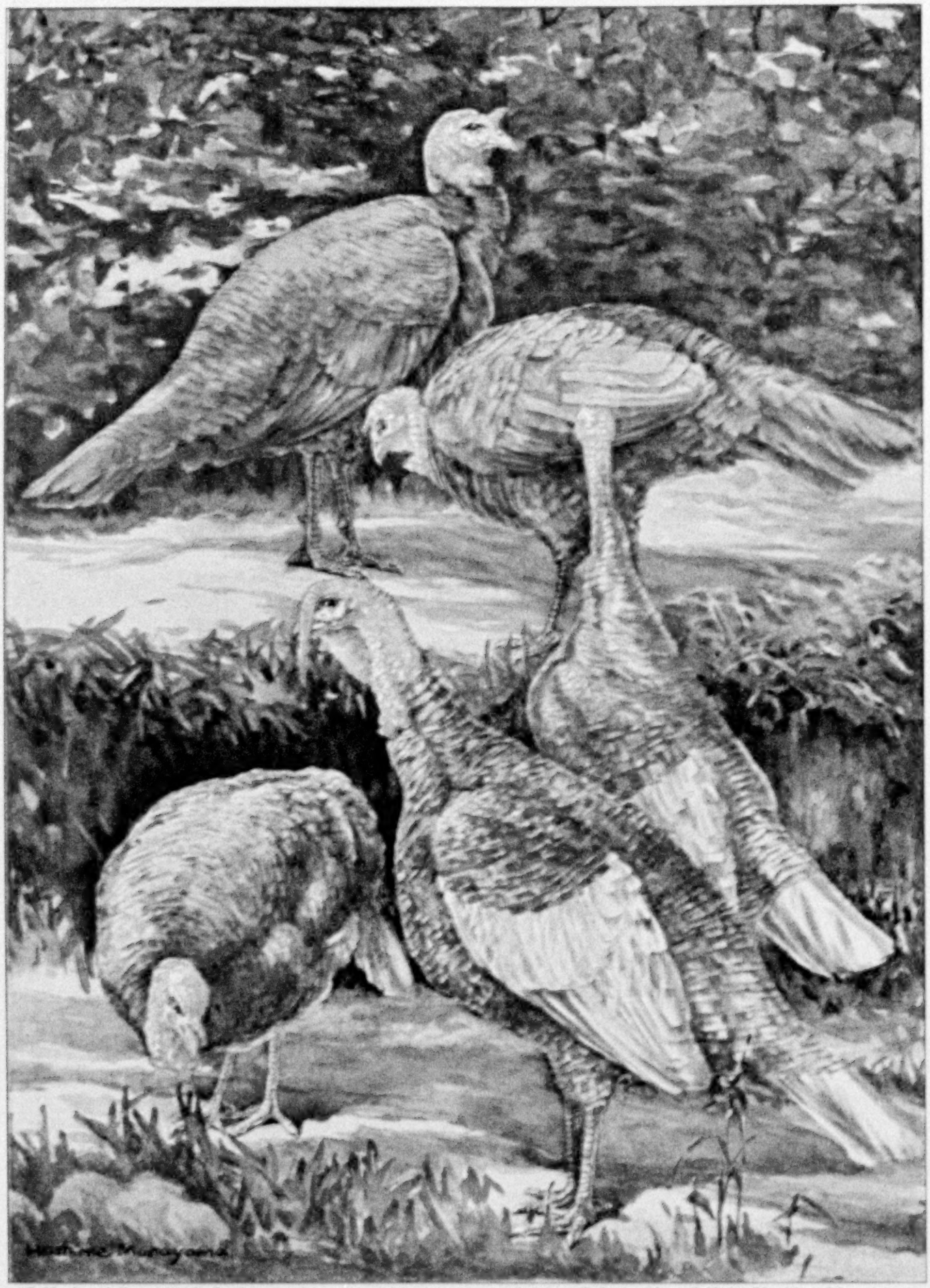
BUFF AND GRAY CALL DUCKS

The Buff variety (two, lower left) is primarily a novelty and is bred for fancy only, although in America it is recognized as a standard breed. The Gray Call variety is somewhat similar in color to the mallard duck, and also is bred for fancy only. The curled tail feathers in both species identify the males.



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SLATE AND BOURBON RED TURKEYS

The origin of the Slate variety (upper two) has not been established, but it may have come from crosses between the Black and the White (see Color Plates IX and XI). The Bourbon Red, formerly called the Buff, was probably produced from crossings between the Bronze (see Color Plate X) and the White. All turkeys came originally from North America.

throughout Europe new domestic breeds have been developed from time to time.

Probably duck raising on a commercial scale has been practiced for a longer time in China than in any other country.

Many eggs are incubated in wickerwork baskets; others are incubated in primitive, barrellike structures. Heat is sometimes provided by burning charcoal and sometimes the "incubators" are placed in compost heaps.

The young ducks are grown on land with access to the water or they are kept in large duck boats, which transport the birds up and down the rivers in search of new feeding grounds. Canton is an important duck center and two types are recognized commercially in this section, the "Li" and the "Loo" ducks, the former being darker in color, larger and coarser in texture. Some of the duck farms carry upward of 3,000 ducks on as small an area as one-third of an acre.

Ducks are raised extensively in many parts of Europe, especially in Belgium and the Netherlands, where the farms are located on the sides of watercourses communicating with canals.

Remarkable progress has been achieved in breeding heavy-laying strains of ducks in England, Australia, and New Zealand. In 1920–21 a duck in an officially conducted egg-laying contest in New Zealand made the phenomenal record of 363 eggs in 365 days.

In the United States ducks are raised in all parts of the country, especially in the vicinity of the larger eastern cities.

Incubators hatch millions of eggs, and on some of the farms the operations are conducted on such a large scale that trucks on tracks are used to convey the feed to the ducks. A special market has been developed for "green" ducks, those from eight to twelve weeks old. Duck feathers, especially from the Pekin breed, are used extensively in making cushions, pillows, and mattresses.

DELICACIES FROM DUCK EGGS

In the Dutch bakeries duck eggs are used to a large extent in the manufacture of an important article for the breakfast of Netherlanders. This is the *beschuit*, or zwieback, without which "the average Hollander cannot well begin his day."

The Filipino prefers his duck eggs served as *balut*. The egg is incubated, by various processes characteristic of the country, until the eighteenth or nineteenth day, and boiled. It is then considered delectable.

Most people like their eggs fresh—in fact, the fresher the better—but in this world of paradoxes it is interesting to note that the Chinese coat their duck eggs with a specially compounded preparation, after which their age is a criterion of their delicacy.

THE RUNNER

(For illustration, see Color Plate II)

A duck of rather small size, upright in carriage and of relatively little use in the early days, was developed into the Runner breed. Its original prototype was the Penguin duck, said to have been imported into England from Bombay. Just prior to 1894 ducks were exhibited in England as Indian and Canadian Runners, both of which names, however, were misnomers, as they originated across the Channel from England.

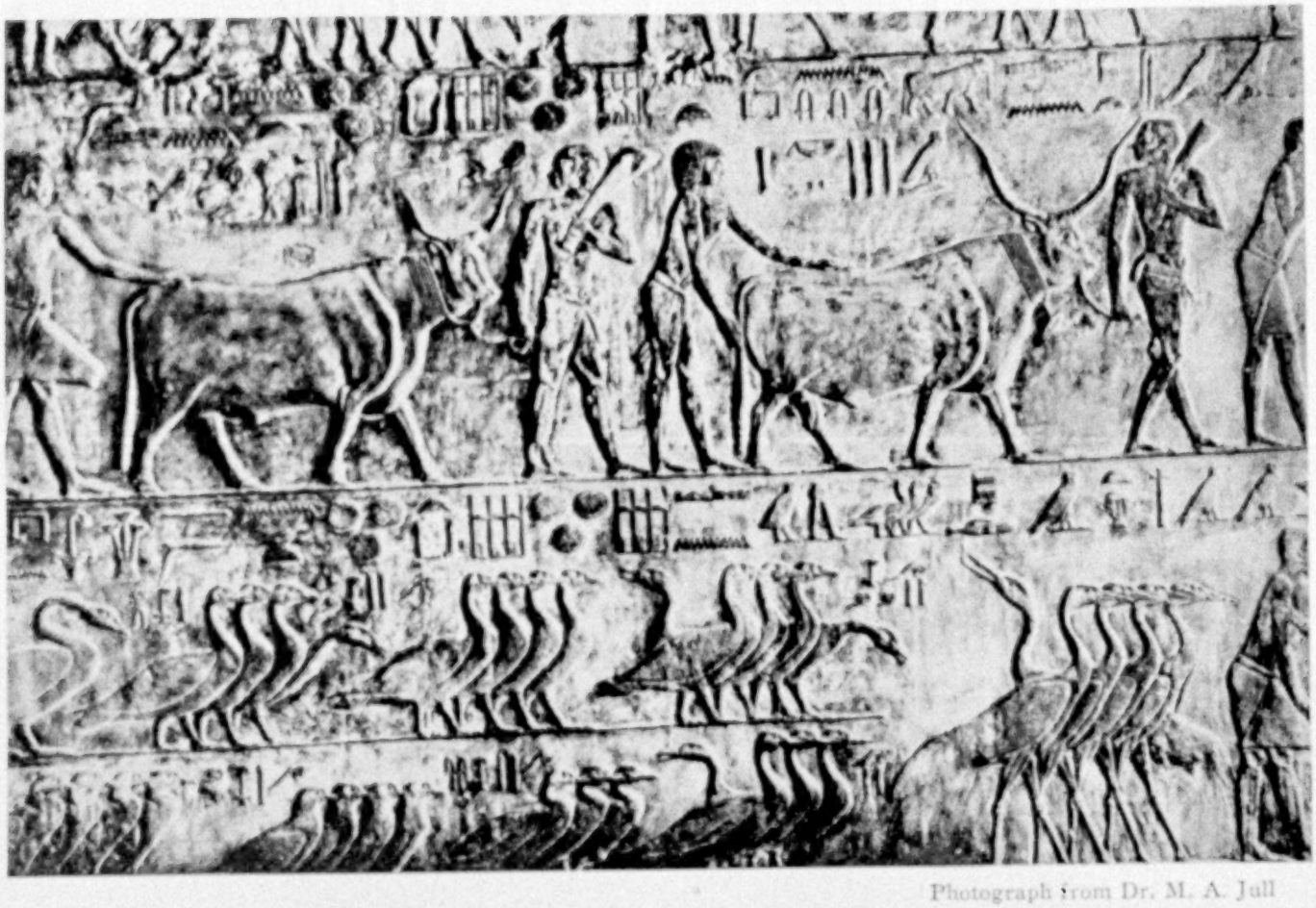
In the United States the Runner was recognized as a standard breed in 1898, and now there are three varieties, Fawn and White, White, and Penciled. The body is long and narrow and is carried in a very upright position. The standard weights are: adult drake, 4½ pounds; young drake, 4 pounds; adult duck, 4 pounds; young duck, 3½ pounds.

The Penciled Runner is for the most part fawn in color, with the upper two-thirds of the neck white and the tail in the male dull bronze-green.

THE MUSCOVY

(For illustration, see Color Plate II)

The Muscovy duck, *Anas moschata*, differs from all other domestic breeds in that it belongs to a different species, and in Brazil, where it apparently originated, as well as in other parts of South America, it is known as the Pato, or Brazilian duck. It has no "quack" and the drake does not have any curled sex feathers at the base of the tail, a characteristic of all other drakes. Furthermore, the mature drake is considerably larger than the mature duck. Another peculiarity of the Muscovy is the bare skin about the eyes



Photograph from Dr. M. A. Jull

GEESE FIGURE IN THE MURAL RELIEFS OF ANCIENT EGYPT

In the sacrificial chamber of the mastaba (a rectangular cut stone tomb) of Ptahhetep at Sakkara, near Cairo, are reliefs which rank among the highest achievements of ancient Egyptian art. The upper panel shows herdsmen bringing in cattle for inspection; the lower depicts a row of geese, with pigeons below and cranes to the right. Ptahhetep was a prominent man of his day and the author of the "Proverbs of Ptahhetep," the earliest piece of literature known in Egypt.

and at the base of the bill, where the skin projects prominently in the male.

The standard weights are: adult drake, 10 pounds; young drake, 8 pounds; adult duck, 7 pounds; young duck, 6 pounds.

THE BLUE SWEDISH

(For illustration, see Color Plate III)

This very attractive duck received the name Blue Swedish from the fact that it came from Pommern (Pomerania), part of which originally belonged to Sweden. It was introduced into England about 1835, and subsequently some of the birds descended from the original stocks were mated with Rouens.

The Blue Swedish was imported into the United States more than 30 years ago and was recognized as a standard breed in 1905.

The standard weights are: adult drake, 8 pounds; young drake, 6½ pounds; adult duck, 7 pounds; young duck, 5½ pounds.

THE AYLESBURY

(For illustration, see Color Plate III)

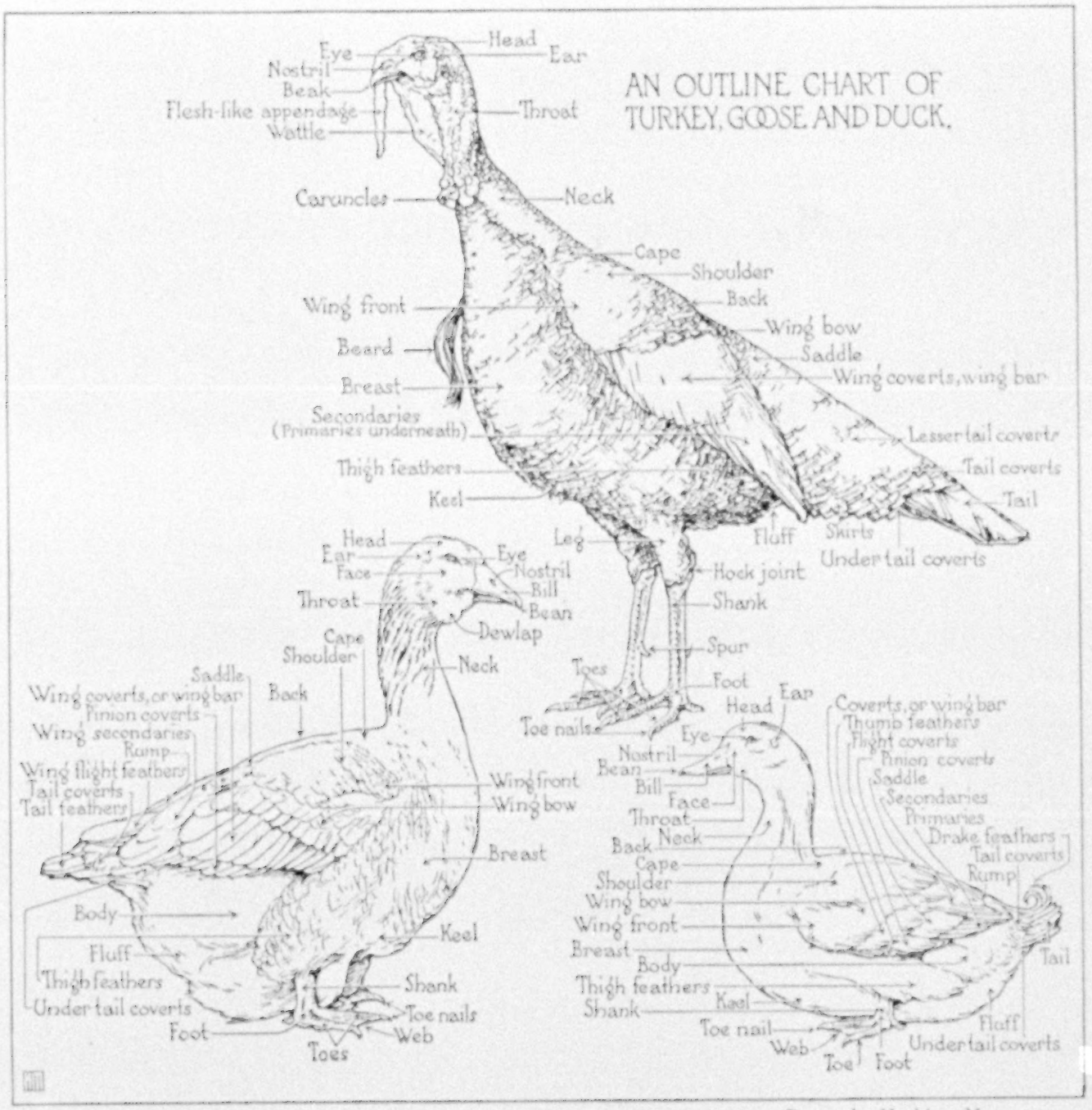
A large white duck, first known as the White English and later as the Aylesbury, was well known in England as early as 1815. It was developed as a large meat-producing breed and was apparently somewhat larger than the present-day Aylesbury in America. It was first shown in the United States in Boston in 1849. Its standard weights are: adult drake, 9 pounds; young drake, 8 pounds; adult duck, 8 pounds; young duck, 7 pounds.

Its heavy weight makes the Aylesbury an excellent market duck, and in England it is still popular, although in the United States it has been almost entirely superseded by the Pekin (see Color Plate V).

THE CRESTED WHITE

(For illustration, see Color Plate IV)

The Crested White is simply a white duck with a novel characteristic in the



Drawn by Hashime Murayama

DIFFERENCES IN THE STRUCTURES OF TURKEYS, GEESE, AND DUCKS

For the purposes of this chart, the Bronze turkey, the Toulouse goose, and the Rouen duck were selected as typical of their respective species.

form of a prominently developed crest. There are colored ducks with crests, but in the United States they are not recognized as standard.

The Crested White is kept largely for fancy, although it is a bird of good size.

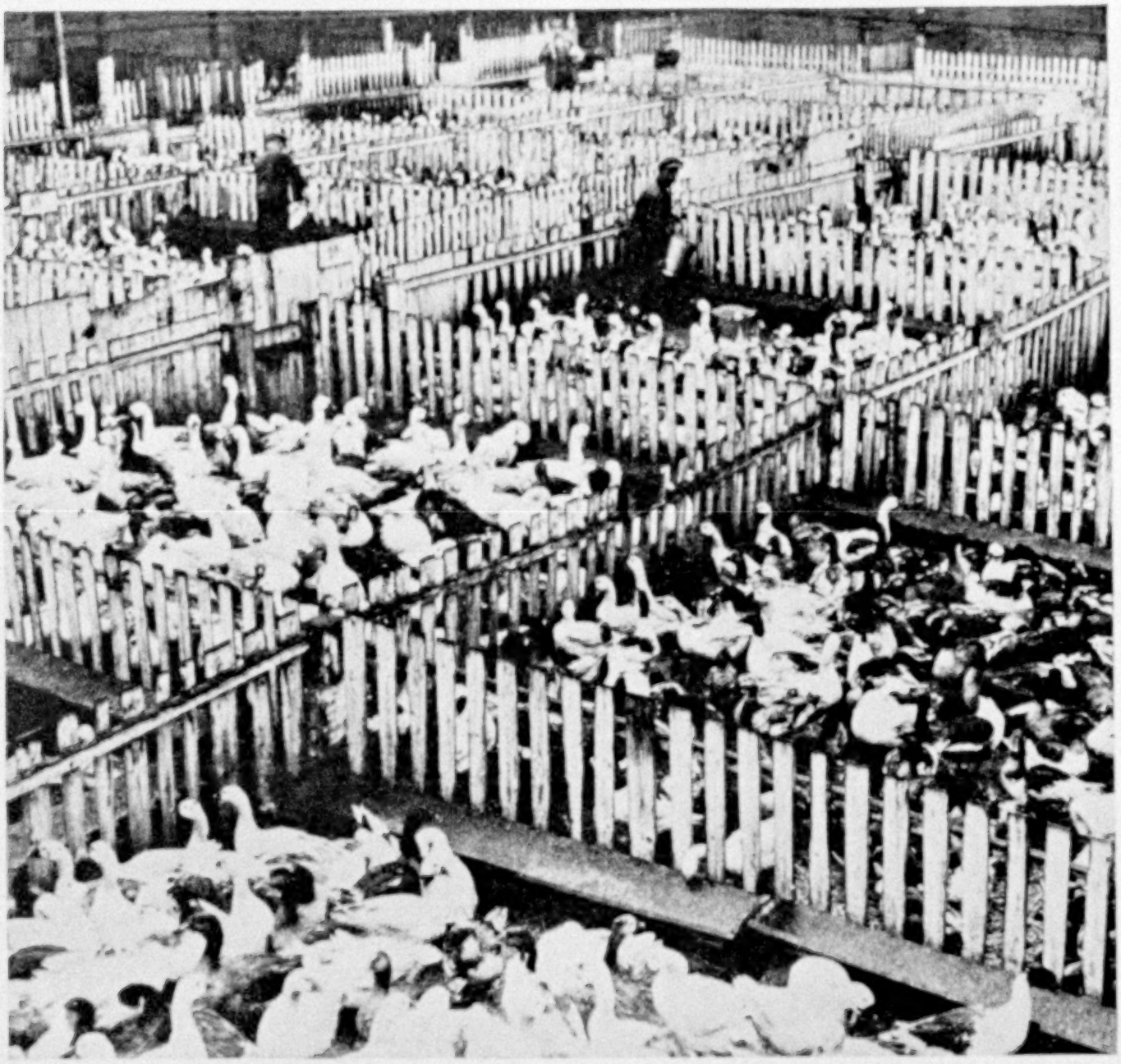
THE ROUEN

(For illustration, see Color Plate IV)

For a century a duck derived from the wild Mallard, which it resembles in color, has been known under the name Rouen. It was bred extensively in France for many years, was later improved in England, and now is bred everywhere.

The plumage colors shown in the illustration are of the adult drake and the duck, but the drake assumes practically the same plumage coloration as the female during the summer months after the annual molting. In the fall of the year the drakes resume their normal plumage color.

The standard weights of the Rouen are the same as those of the Aylesbury. The Rouen was very popular years ago for the quality of its flesh, but it is not bred as much as either the Aylesbury or the Pekin for market purposes now. It is one of the most attractive breeds in existence.



Photograph from Wide World

NO DEARTH OF CHRISTMAS GOOSE FOR BERLIN

The Germans' favorite holiday birds are fattening by thousands in pens at Friedrichsfelde, near Potsdam. Most of the fattening is done in the autumn, but a new industry is being developed by hatching the goslings in winter and fattening the young geese in the spring. Hamburg is the center for this new industry (see, also, text, page 350).

THE BLACK EAST INDIA

(For illustration, see Color Plate V)

The Black East India is one of the bantam breeds of the duck family and is prized for its small size. It is sometimes referred to as the miniature Cayuga (see Color Plate VI and text on opposite page), although it is possible that it descended from the wild Black Mallard, *Anas obscura*.

The Black East India duck is entirely black, including the bill and shanks and toes. It is a very desirable ornamental breed, for which no standard weights have been accepted.

THE PEKIN

(For illustration, see Color Plate V)

The duck industry of the United States owes a great deal to the Pekin breed, a fast grower, now raised for commercial purposes almost to the exclusion of other breeds.

The Pekin was first imported into the United States from Shanghai in 1873 and was recognized as a standard breed in 1874. It was taken to England from China about the same time. The Pekin as bred in America has gained such wide recognition that Japan has made importations from this country.

Photograph by H. Armstrong Roberts

A WATCHFUL CROOK RESTRAINS THE WANDERER

Though more goose meat per capita is consumed in Germany than in any other country, the goose population of France assumes large proportions from Strasbourg down to Grenoble, in the southeast, and from Carcassonne to Mont-de-Marsan, in the southwest (see, also, text, page 346). In many European countries, gooseherds gather up the individual birds and flocks of the community and take them to pasture on land adjacent to rivers, brooks, and lakes. In the evening the birds are returned to their respective homes.

When the Aylesbury (see text, page 338) was at the height of its popularity in England, several importations to America were made for the purpose of mating with the Pekin, but eventually the Aylesbury blood was eliminated entirely and the pure strain restored.

That the Pekin is a good market duck may be judged from its body conformation, as shown in Color Plate V, and from its standard weights: adult drake, 9 pounds; young drake, 8 pounds; adult duck, 8 pounds; young duck, 7 pounds.

THE CAYUGA

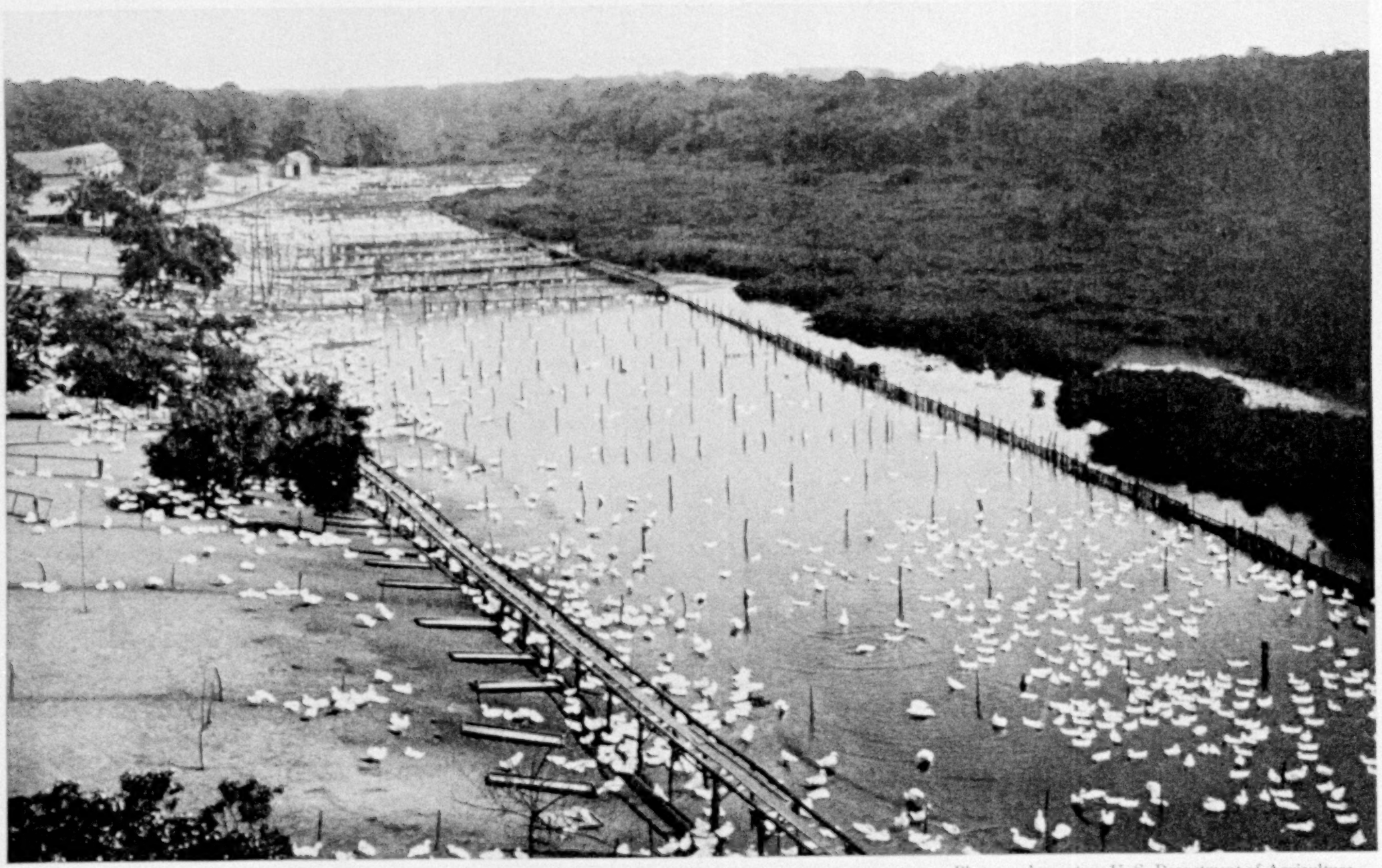
(For illustration, see Color Plate VI)

The Cayuga breed originated from a pair of wild black ducks caught in Dutchess County, New York State, in 1809. Whether they were variants of the wild Mallard, *Anas boschas*, or of the wild Black Duck, *Anas obscura*, is not known. Descendants of the Dutchess County domesticated stocks were taken to Orange County in 1840 and soon became widely distributed in Cayuga County, whence the name. The Cayuga grew in popularity

Photograph from Acme Newspictures

"THAT ROYAL BIRD, WHOSE TAIL'S A DIADEM," WALKS ABROAD IN ALL ITS GLORY

Only the male peafowl presents the gorgeous spectacle at the left; the female (center) is more somberly colored. On the lawn at Ranelagh, England, during a golf tournament.



Photograph courtesy U. S. Department of Agriculture

"QUACK, QUACK" IS PROFITABLE MUSIC TO THE EARS OF DUCK FARMERS

New York has more duck farms than any other State, and many establishments market from 50,000 to 100,000 birds the first six months of every year. Farms along the coast, both on Long Island and in Rhode Island, usually have sandy yards, cleansed by the rise and fall of the tide. To facilitate the feeding of enormous numbers of birds, this farm has an elevated feed track along the left side of the water.

Photograph by H. Armstrong Roberts

THE TOULOUSE IS THE MOST POPULAR GOOSE IN FRANCE

Long famous in southern France, the gray bird represents the utmost development of size and table quality (see, also, text, page 361). It is the largest of all the standard breeds and is probably the most popular in the United States to-day.

for a time, but was soon supplanted by the Pekin. Nowadays it is bred largely for the fancy.

THE KHAKI CAMPBELL

(For illustration, see Color Plate VI)

A new breed of duck was shown, presumably for the first time, by Mrs. A. Campbell in England at the time of the Khaki election, so called because of the number of voters in uniform at the close of the Boer War. It was developed as an egg-producer. The demand for duck eggs for table purposes in England had been on the increase, particularly since many Runner breeders had taken pains to produce ducks that laid eggs without the characteristic strong flavor. The success of the Khaki Campbell as an egg-producer is borne out by the fact that in a recent laying trial 17 pens of them produced an average of 231.4 eggs per bird and a single duck of this breed laid 357 eggs in 365 days.

The Khaki Campbell is not recognized as a standard breed in the United States, although it is being raised in this country to some extent, as well as in Egypt, Burma, Persia, Australia, and several European countries. English authorities state that 4½ pounds is the average weight of a mature bird of either sex.

Photograph by Dr. Fritz Pfenningstorff

GERMANY "NOODLES" TURKEYS AS WELL AS GEESE

In the special fattening process known as "noodling," the noodles are dipped into warm milk before being fed to the birds (see, also, illustration, page 349).

THE BUFF

(For illustration, see Color Plate VII)

The Buff breed was originally developed some twenty years ago, as the Buff Orpington duck, by the originator of the Buff Orpington chicken, Mr. William Cook, of England, who intercrossed the Rouen, Cayuga, Runner, and Aylesbury breeds. The Buff Orpington was first shown in England about 1907 and in the United States in 1908–9. It was admitted to the American Standard of Perfection in 1915, under the name of the Buff, but it has not become very popular. In England it has made some good egg records.

The standard weights are: adult drake, 8 pounds; young drake, 7 pounds; adult duck, 7 pounds; young duck, 6 pounds.

THE GRAY CALL

(For illustration, see Color Plate VII)

The Gray Call is a very small decorative duck, descended directly from the Mallard. Its plumage pattern resembles somewhat that of the Rouen (see Color Plate IV), and, like the Rouen drake, the Gray Call drake assumes a plumage color approximating that of the female during the summer months.

Besides the Gray Call, there is a White Call variety recognized as standard. The plumage is white and the bill, shanks, and toes are bright orange.

Photograph by Holmes from Galloway

MEXICO KNEW THE TURKEY LONG BEFORE COLUMBUS CAME

To what extent the Aztecs had domesticated the wild bird before the Spaniards arrived is not certain, but undoubtedly it was kept in captivity and had been known to the Montezumas for centuries. In Mexico City turkeys are brought alive to the market for the housewife to buy "on the hoof." The scientific family name of the six races of wild turkey is *Meleagridae*.

There are raised in America eight or ten domestic breeds of ducks in addition to those illustrated in the accompanying color plates, but they are of less importance.

GEESE

The goose that laid the golden egg, the "cackling" geese that saved Rome from the attacking Gauls in the fourth century B. C., and the modern domestic goose, through the various services rendered to mankind, have all contributed to the high esteem in which these fowls have long been held.

Naturalists are in general agreement that the wild Graylag goose, *Anser anser*, is the ancestor of all of the domestic breeds of geese known to-day, with the exception of the Canadian and the Egyptian geese.

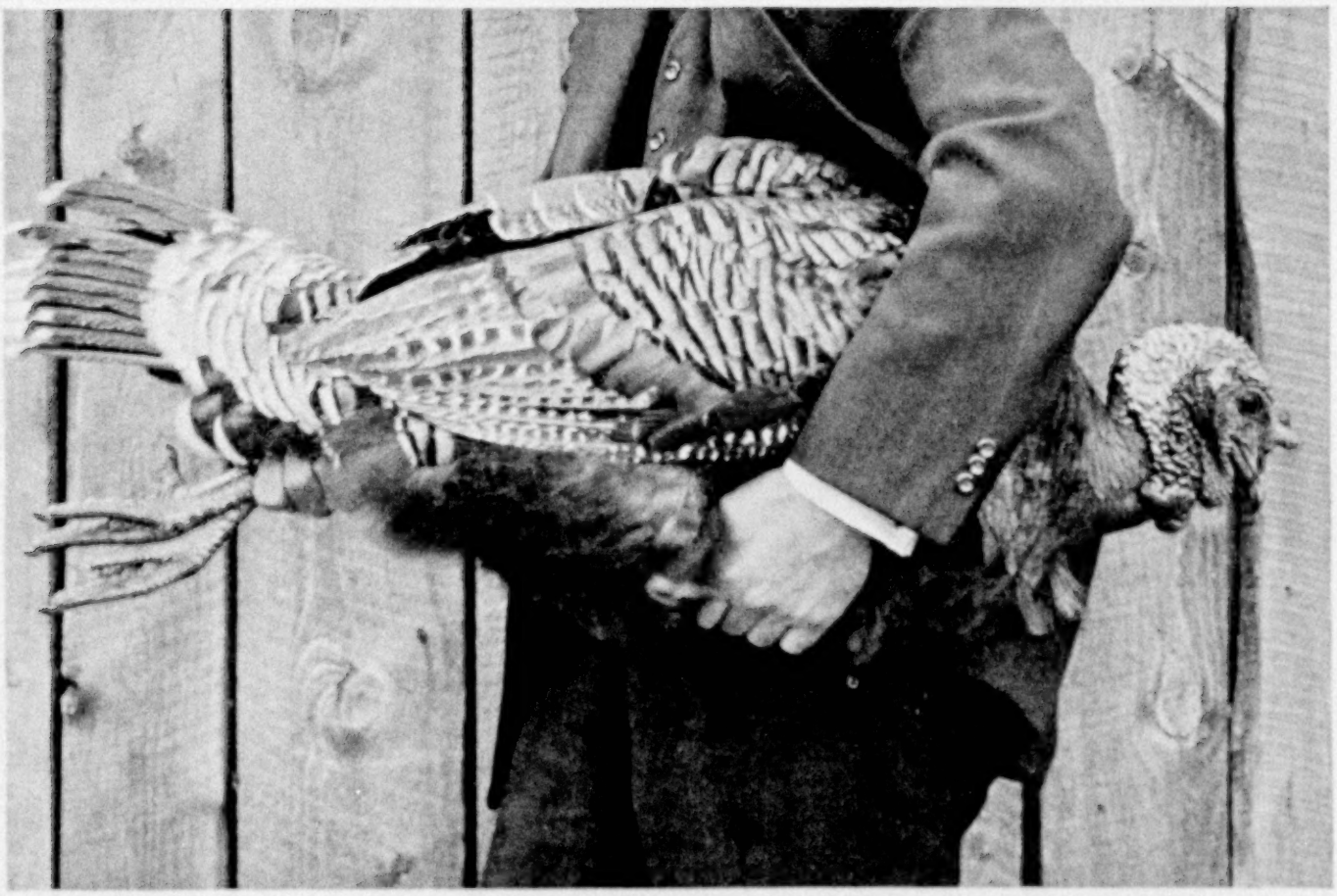
When man first entered Europe the Graylag goose apparently existed in great numbers. It has a vast summer range, from Iceland, Scandinavia, and Finland as far south as the Caspian and Black Sea districts in Russia, across Asia as far as Kamchatka. Its winter range includes Central Europe, the Mediterranean, India, and China.

The wild Canadian, or Canada, goose, *Branta canadensis*, is the ancestor of a domesticated breed known by the same name. In the summer it ranges as far north as Alberta and Saskatchewan, farther northward to the limit of trees, and as far south as Oregon on the west and Tennessee

Photograph by R. R. Sallows

"GETTING IT IN THE NECK"

As "National Thanksgiving Bird," the turkey is well named, for various countries in addition to the United States regard this truly American bird as essential in the proper celebration of certain holidays.



Photograph courtesy U. S. Department of Agriculture

THE PROPER WAY TO CARRY A TURKEY

This mode of handling will not harm the bird or permit it to do any damage. Heavy birds, if carried by the feet, are liable to serious injury. The value of the turkey as food is due not only to the excellent flavor of the flesh, but because of the enormous size which it attains. A bird weighing 60 pounds or more is not phenomenal.

Photograph courtesy U. S. Department of Agriculture

THE "TURKEY TROT" IS FAMILIAR TO CERTAIN SECTIONS OF THE WEST

In areas where the turkey population is large, dealers send buyers into the country to gather up a drove of several hundred birds. They stop at farms, weigh the birds the farmers want to sell, add them to the drove, and drive them like cattle to the dressing plants. This practice is being discontinued, however, as the turkeys lose too much weight on long drives.

Photograph courtesy Nebraska Agricultural Experiment Station

"TALKING TURKEY" IN NEBRASKA

This truckload of crates contains 432 birds. Turkeys are raised in nearly every part of the United States, but Texas Missouri, Oklahoma, California, Kentucky, and Virginia take the lead. Texas alone usually ships each year approximately 1,200 cars containing about 2,000 birds each, a total of 2,400,000.

on the east. The principal winter range includes the southern half of the Mississippi Valley west of the Mississippi River. The color is the same as that described for the domesticated breed (see Color Plate XIV).

The wild Egyptian goose, *Chenalopex aegyptiacus*, is the progenitor of the domesticated breed of the same name. It ranges north well over Europe and breeds in England and Scotland as well as farther south. The color description of the domesticated breed (see Color Plate XIII) applies to the wild species.

Photograph by Jacques Boyer

CRAMMING THE GOOSE FOR THE EPICURE'S PÂTÉ DE FOIE GRAS

The size of the liver obtained by such forcible feeding is sometimes almost incredible—two and a half to three pounds (see, also, text, page 352).

THE GOOSE IN DOMESTICATION

With the possible exception of the chicken, the goose was probably the first bird domesticated. It was regarded as a sacred bird in Egypt 4,000 years ago, and it is seen on some of the ancient mural reliefs of that country (see illustration, page 338). In the tomb of Tutankhamen delineations of geese in some of the decorations were found to be in such perfect condition that different kinds are plainly recognizable. Victor Hehn, a German scientist, has found references to geese in Sanskrit writings.

Penelope, in Homer's Odyssey, in that beautiful passage in which she relates her dream to her disguised husband, is pictured as deriving much pleasure from a flock of 20 geese. Then, again, in the Edda, Gudrun's geese scream when she laments over the corpse of Sigurd.

Very early the Romans learned the value of goose liver as a delicacy, and enormous numbers of birds were placed in goose pens, called *chenobosca*, and forcibly fattened—poor thanks for having saved Rome!

Varro (see, also, text, page 328) gives a lengthy discussion concerning the breeding and rearing of geese. In Pliny's time geese were driven in flocks from Belgium and France to Italy. This writer says: "Messalinus Cotta, the son of Messala, the orator, discovered the method of cooking the webs of the goose's feet and fricasseeing them in small dishes, along with cocks' combs."

Photograph courtesy U. S. Department of Agriculture

PLUCKING DUCKS IS HARD WORK

The large duck farms have pickers who devote their entire time to dressing birds during the marketing season. They are highly proficient, the average worker being able to pick from 50 to 70 ducks in a day. A busy scene at Eastport, Long Island.

Early in the Christian era the domestic goose had become well distributed over Europe.

The Romans first learned the use of feathers for filling cushions and mattresses from the Celts and the Germans, among whom goose culture became an extensive enterprise. In lower Languedoc (France) the keeping of geese was conducted on such economical lines that each small farmer kept two or three females only, the keeping of ganders being avoided because of the cost of feeding them. In the spring of the year the farmer led the female to the male, which was kept on the larger farms. Toulouse, in the south of France, became not only one of the most important centers of goose culture in all France, but developed one of the best breeds kept to-day.

Goose raising is still an important enterprise in France.

In Germany more goose meat is consumed per capita than in any other country. Geese in small flocks are raised throughout the Republic, yet enormous numbers of birds are imported annually from Poland, Russia, and Lithuania. There are goose-fattening establishments in many places, one of the largest being in the Oder Bruch, where seven million fowls are fattened annually.

Most of the fattening is done in the fall of the year, but a new industry is being developed by hatching the goslings in winter and fattening the young geese for market in the spring. Hamburg is the center for this new industry, and the Diepholzer goose is especially adapted to its development.

GOOSE CULTURE IN ENGLAND

Goose raising is an important industry in many other European countries, especially Hungary, where there is readily available much pasture land. If provided with an abundance of grass and water, geese require little else in the way of feed. Girls and boys take the feathered flocks of the community to pasture on land adjacent to the rivers, brooks and lakes, and in the evenings the individual geese or groups of geese are returned to their respective homes.

Photograph by Graham Romeyn Taylor

THE "GOOSE STEP" IN HANGCHOW

"The foolishest geese I ever beheld"—so George Washington characterized the Chinese geese which Gouverneur Morris sent him in 1788 (see text, page 364). They were long known as Swan geese because of their long, slender neck and the resemblance of the White variety to the swan when on the water. They are bred chiefly for ornament and exhibition.

In the first century B. C., when the Romans first invaded Britain, they found domesticated geese. In the course of time geese were pastured on the public lands as well as on private property, the rental charges per goose being fixed by law.

Geese were frequently driven from district to district to feed on the waste grain in the fields after the harvest. Large flocks, numbering from 2,000 to 3,000 each, were driven to market in London by gooseherds, each of whom was attended by two or three boys, who carried crooks for catching lame or wandering birds.

In 1740 the Duke of Queensberry wagered that a flock of geese could travel from Norwich to London faster than an equal number of turkeys. The race was staged and the geese won by two days, by virtue of the fact that upon the approach of nightfall the turkeys took to the trees, whereas the geese moved along steadily from early dawn till dark.

The custom of driving geese to market ceased many years ago, however, because it was found that they could be fattened to better advantage near home.

GOOSE CULTURE IN AMERICA

Goose culture in America had its beginnings with the arrival of the early settlers from those European countries where goose raising had been practiced for centuries. The industry did not develop rapidly, however, probably because of the relative abundance of wild ducks and wild geese as well as other game.

As the country became settled and farms were hewn out of the wilderness, farm flocks were established. Then, as cities grew, commercial goose farms were started.

As early as 1800 goose raising had become an important enterprise in Connecticut, Massachusetts, and Rhode Island, especially in the Little Compton section of Rhode Island. The industry thrived for approximately 100 years, and then began to decline for no apparent reason except that with the improvement of market fa-

cilities many farmers found the production of vegetables and other crops, as well as chicken eggs, more economical.

In other parts of the country, especially in northwestern Ohio and in sections of Illinois and Wisconsin, commercial goose raising was developed extensively, and it is still important in parts of Wisconsin. In the Canadian provinces of Nova Scotia and Prince Edward Island many geese are raised and shipped to the Boston market.

DECLARATION OF INDEPENDENCE WRITTEN WITH A QUILL

From time immemorial the goose has been a generous benefactor of mankind, giving feathers to lie upon, quills with which to feather arrows, pens to transfer man's thoughts to paper, flesh to sustain man's body, fattened livers for the epicurean, and fat to flavor the peasant's soup and for baking purposes.

Even in the time of Pliny the delicate white feathers plucked from live geese were highly prized. That chronicler relates that Roman soldiers campaigning in Germany frequently strayed from the regular routes of march in order to pluck goose feathers, and that military expeditions were sometimes demoralized by the practice.

As countries advanced in civilization, the demand for goose feathers increased. Geese were plucked twice a year, and, in case there are some who might think this a cruel practice, be it noted that the female goose herself plucks feathers and down from her breast when she leaves her nest of hatching eggs in search of food.

During the seventeenth century in England geese were sometimes shorn just as sheep are shorn to-day. In later times plucking was done as often as five times a year, and flocks of several thousand birds were kept primarily for the production of feathers.

In 1417 a royal order commanded that six feathers be plucked from the wings of every goose in England and given to the king, so urgent was the demand for quills at that time.

With the introduction of gunpowder the demand for quills with which to feather the shafts of arrows ceased.

But goose quills also served a less warlike purpose; until recent times they were in great demand for pens.

The slit reed was used as a pen from the beginning of the art of writing among the Egyptians to the fall of the Roman Empire. The quill superseded it and was in use until the development of the steel pen in the nineteenth century. Thus the thoughts of the mighty minds of the Middle Ages and the Renaissance have come down to us chiefly through the medium of the goose quill. Thomas Jefferson used a quill in writing the Declaration of Independence.

In the early days of the domestication of the goose, its flesh was regarded as a luxury to be served only at the banquet tables of the more wealthy citizens. Then, as the domestic birds increased in numbers, the flesh came to play a prominent part in the diet of peasants. Roast goose is popular among all classes in many countries. To-day the popular Christmas bird in France and Germany is not the turkey, but the goose. Smoked breast of goose is sold in both these countries, as is also a canned product which is made by cutting the flesh from the carcass, half cooking it, and putting it in earthenware pots in layers intermixed with goose grease.

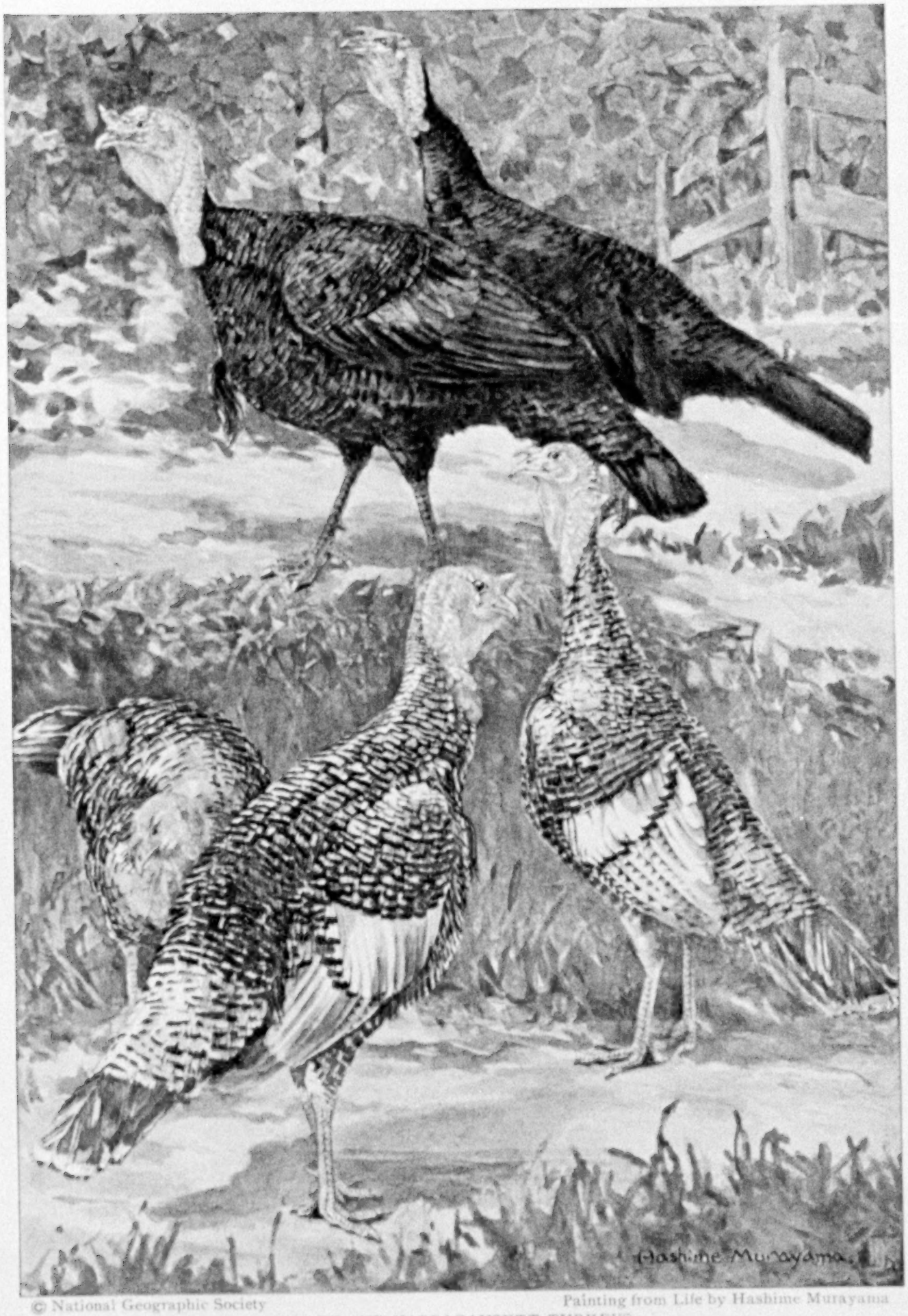
In America, as well as in France and Germany, a large market trade in "green" geese—young geese marketed at from eight to twelve weeks of age—has been developed. Green geese are very popular for roasting purposes.

EARLY ROMANS FORCIBLY FED GEESE TO ENLARGE LIVERS

In Wisconsin geese are fattened by a special process called "noodling," which consists of the forced feeding on noodles made of a grain mixture moistened with milk or water and run through a sausage press, which molds it into "ropes."

The ropes are cut into noodles two or three inches long, which are then boiled. Small flocks of geese are confined in pens and each bird is hand-fed, first about four times daily and then every three hours, night and day. The feeding period usually lasts from two to three weeks, after which the geese are in prime condition and their livers are considerably enlarged.

From early Roman times geese have been especially fattened to produce greatly



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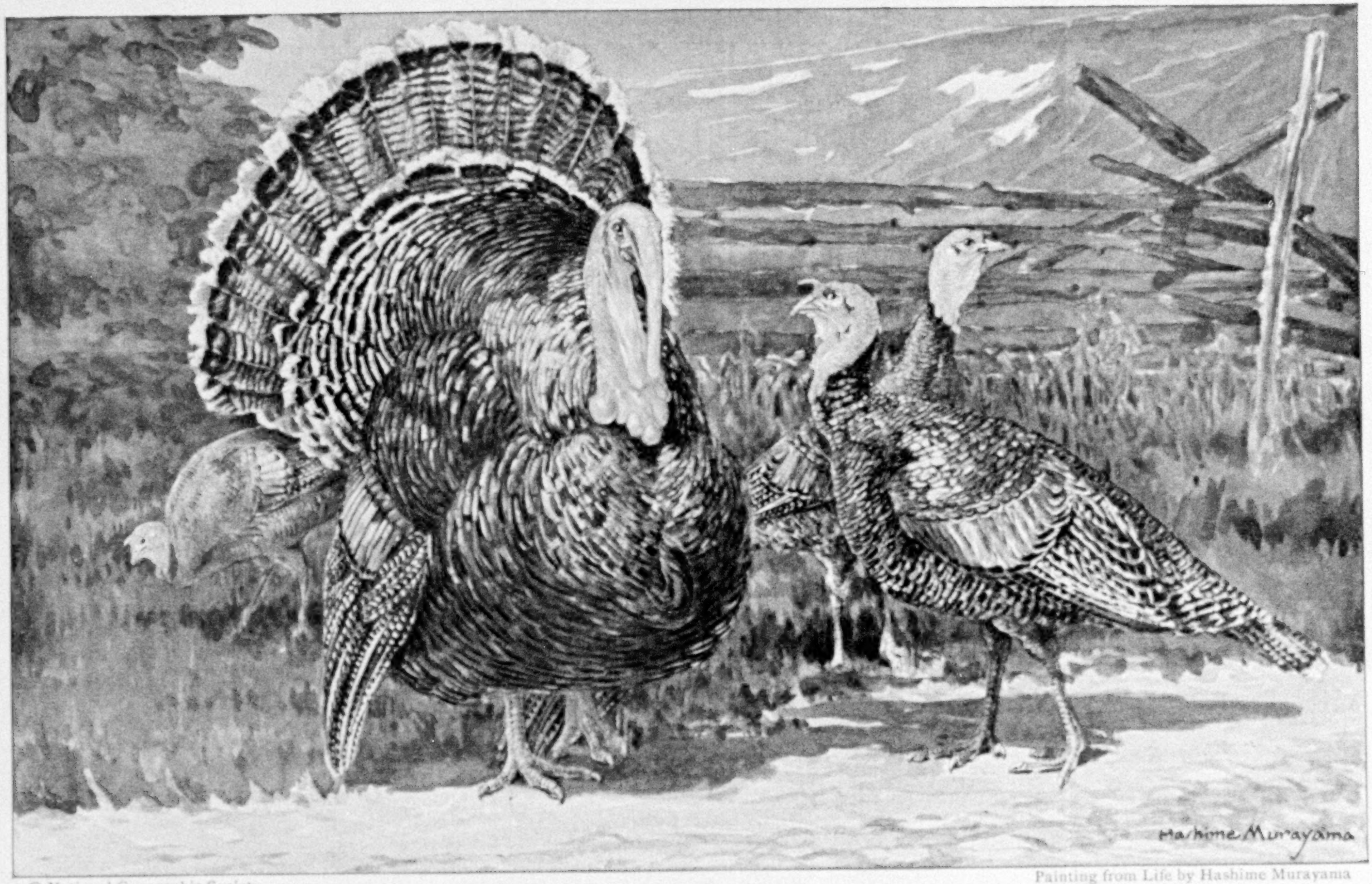
BLACK AND NARRAGANSETT TURKEYS

The Black variety was developed probably in Europe, being bred from some of the Spanish importations of the early Mexican turkeys. The Narragansett takes its name from the bay of the same name in Rhode Island and is descended directly from one of the wild races.



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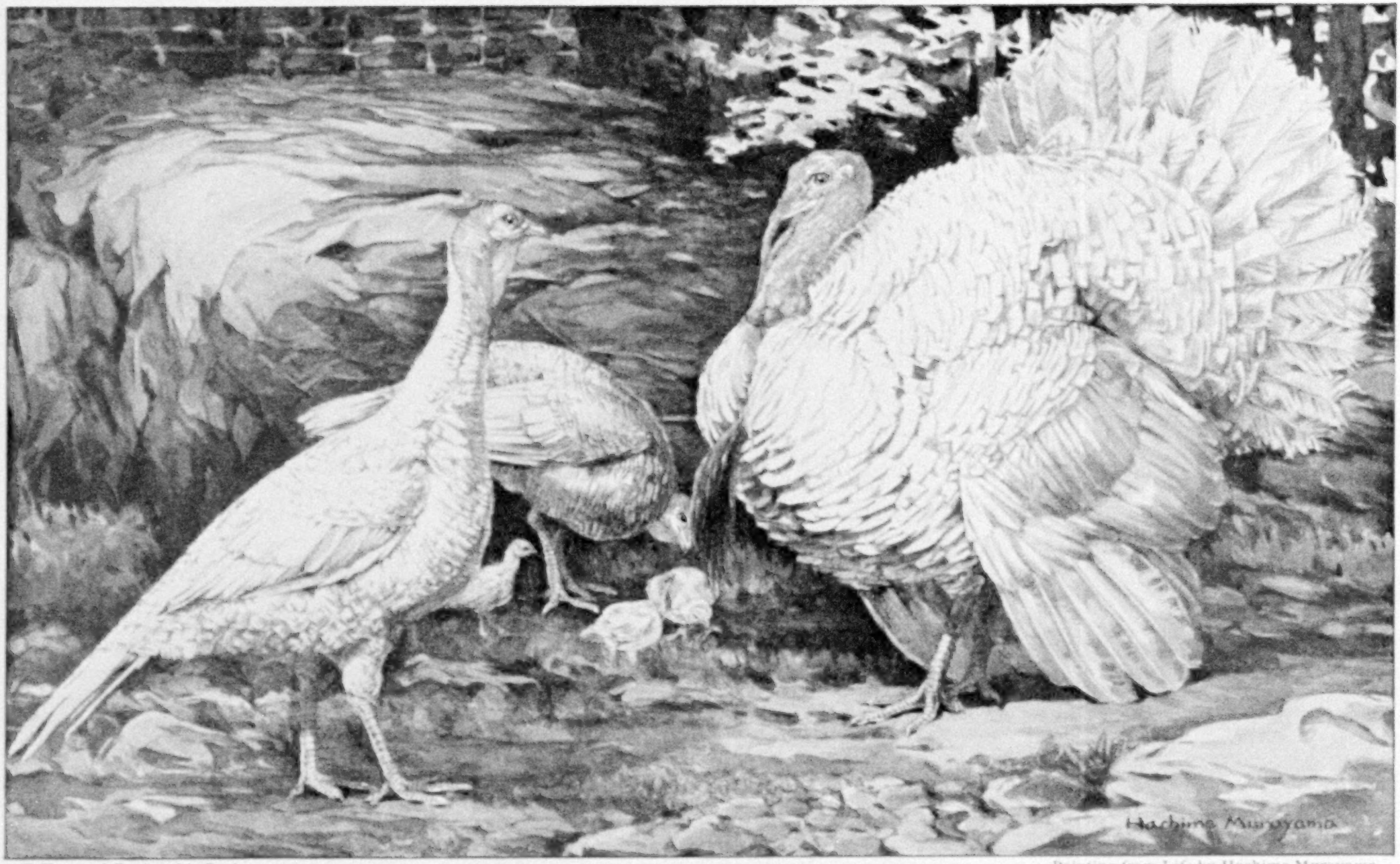
BRONZE TURKEYS

This is the largest, most brilliantly colored, and most popular of all of the varieties of turkeys. Its color markings compare favorably with those of its wild predecessor.



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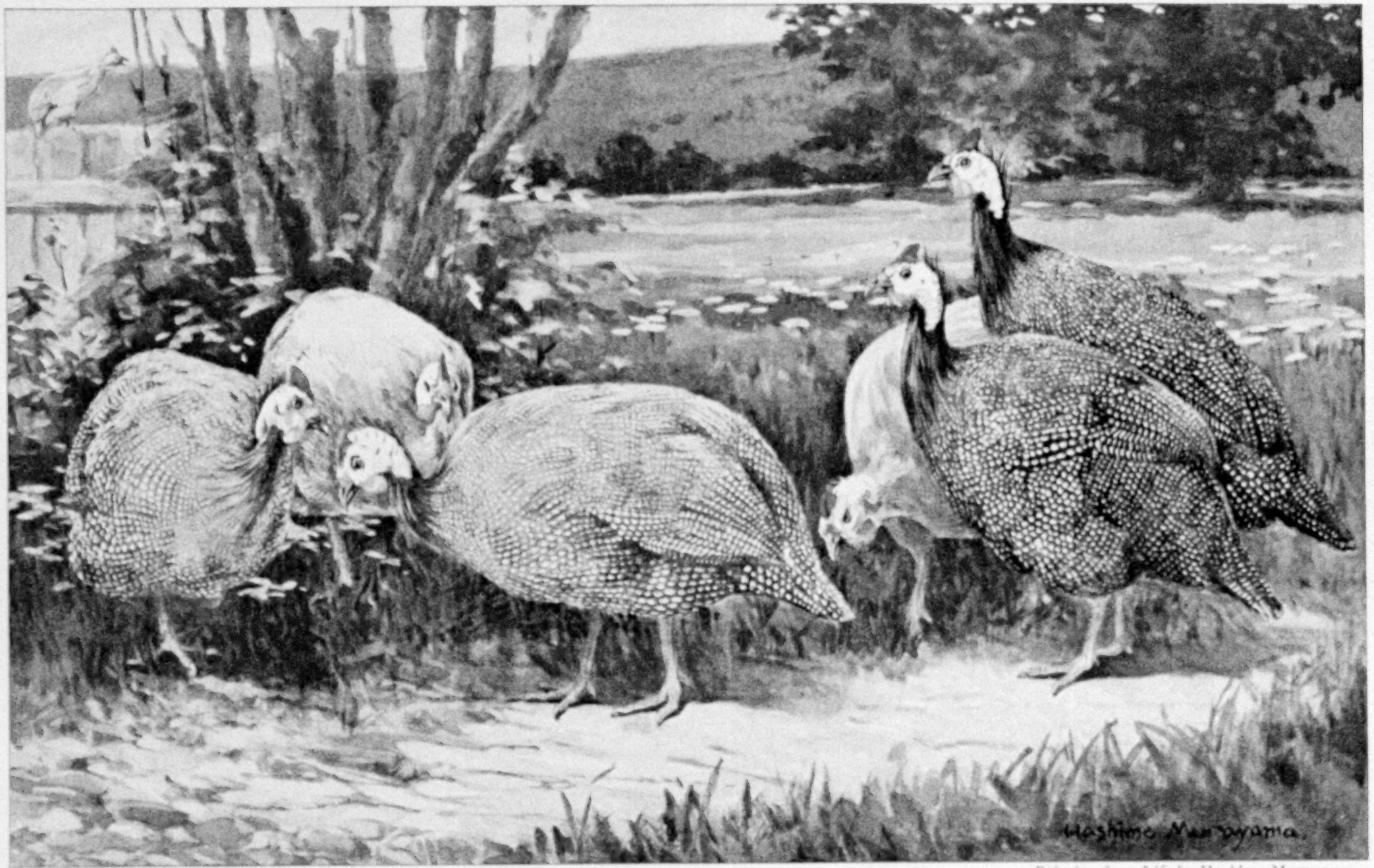
WHITE HOLLAND TURKEYS

The White Holland is supposed to have been developed from black varieties bred in European countries.



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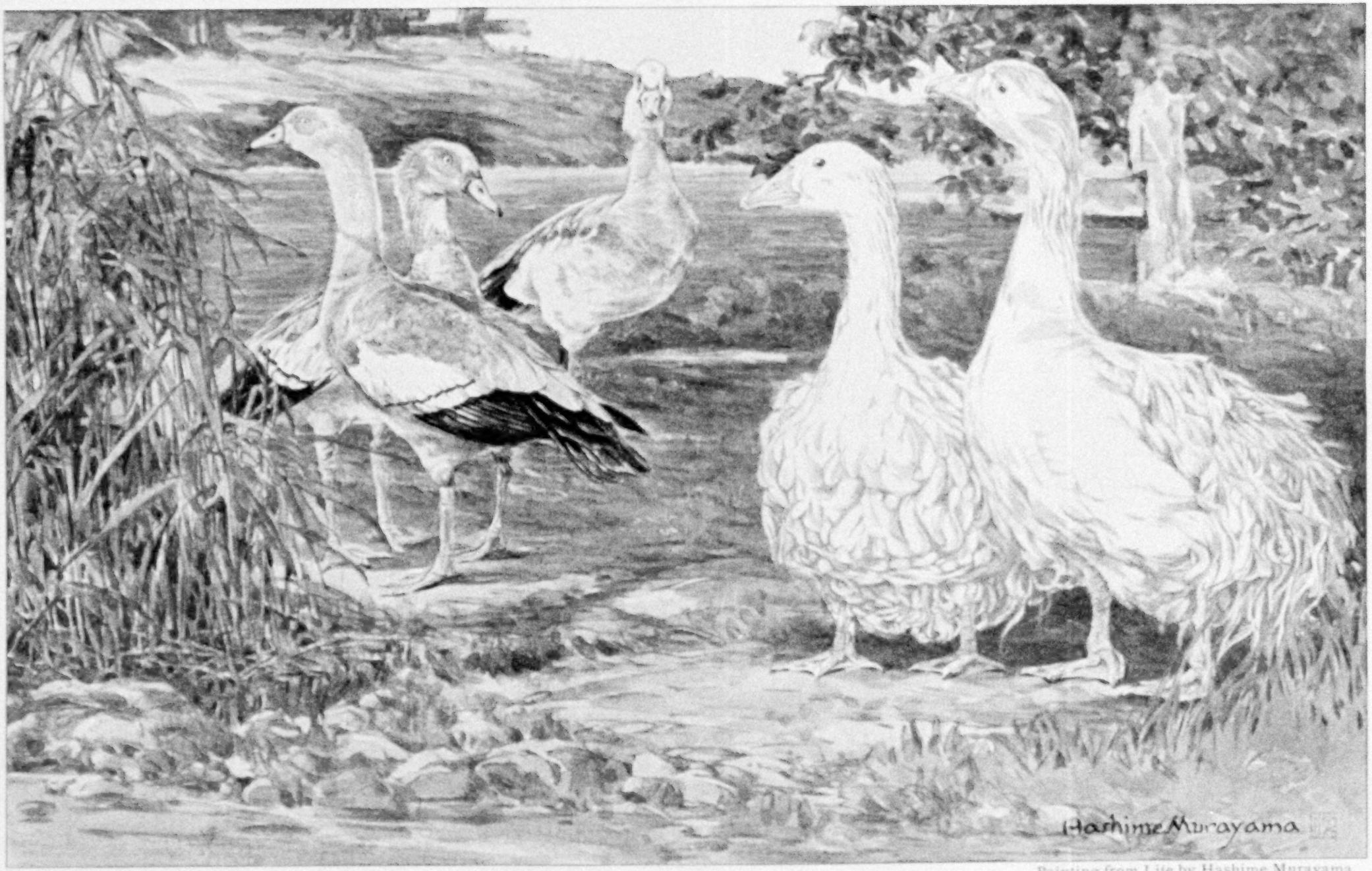
WHITE, PEARL AND LAVENDER GUINEA FOWLS

These three varieties of domestic guinea fowls are descended from the wild guinea fowl which originated in eastern Africa. The Lavender variety is probably the result of a cross between the White and the Pearl. None of the varieties is recognized in the American Standard of Perfection.



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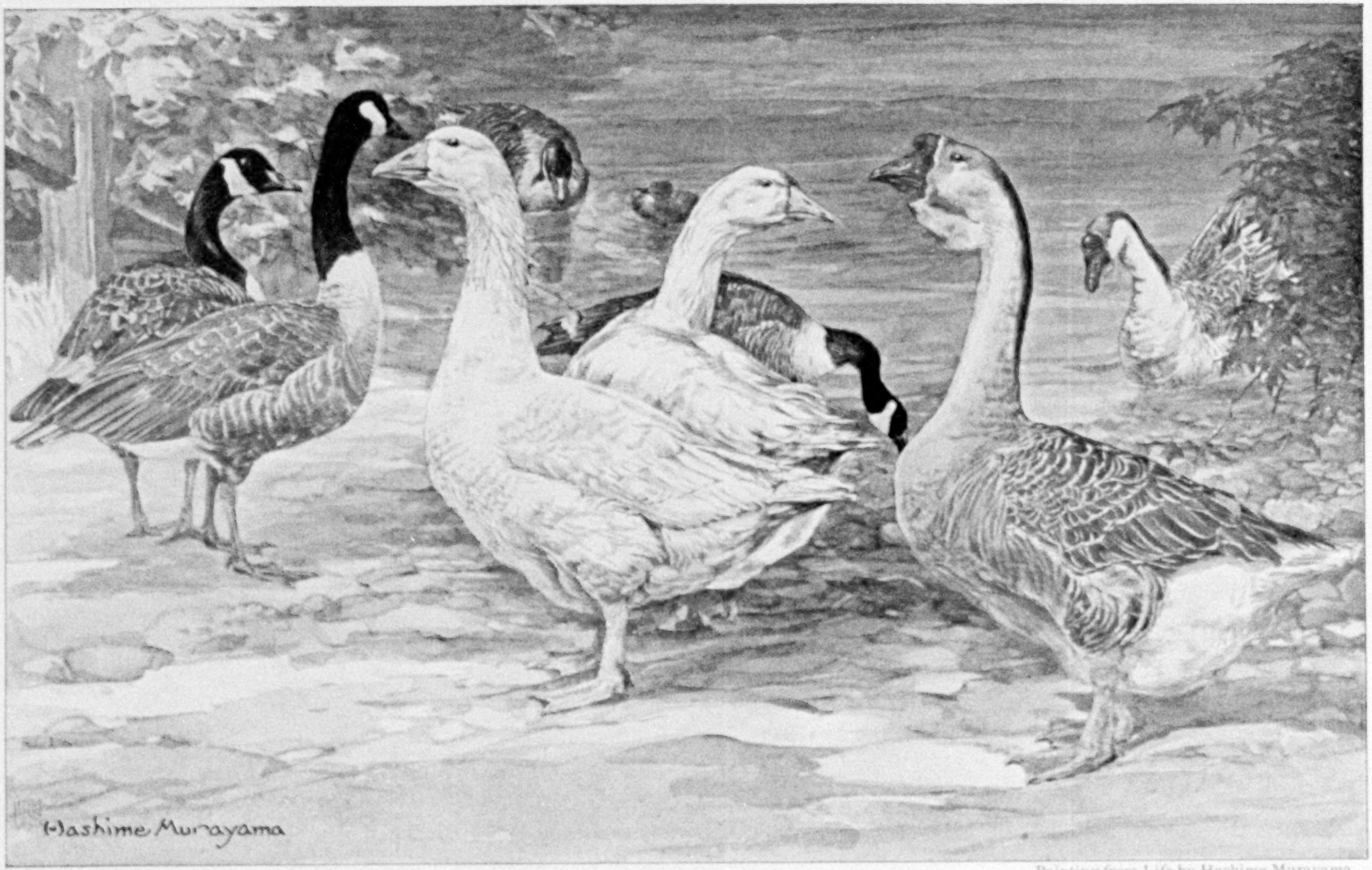
EGYPTIAN AND SEBASTOPOL GEESE

The Egyptian breed is a replica of the wild species originally found in northern Africa and along the lower Nile. The Sebastopol goose is noted for its peculiar feathering, giving the plumage over the body a wavy appearance.



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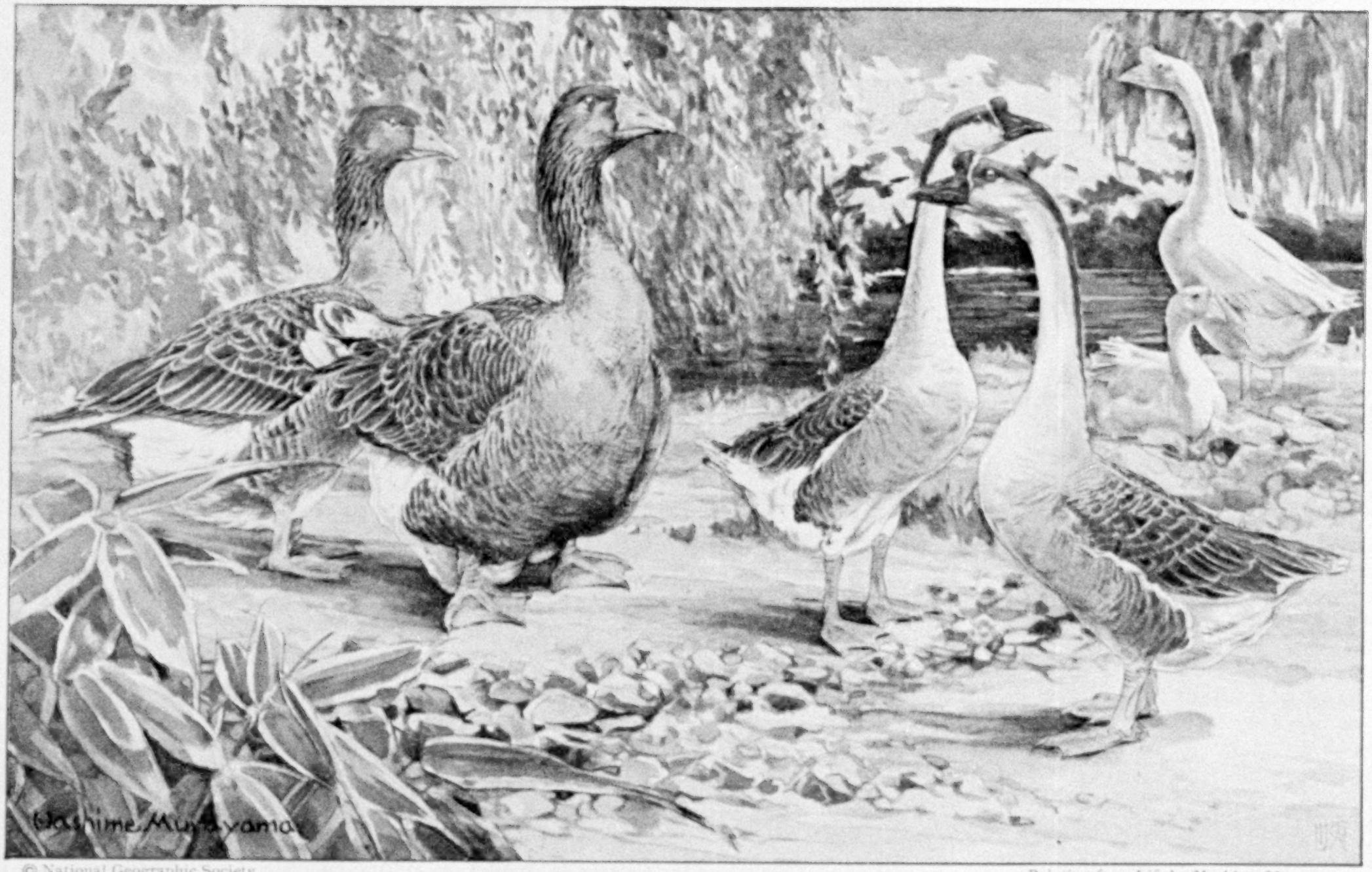
CANADIAN, EMBDEN AND GRAY AFRICAN GEESE

The Canadian goose (two, left, and two in left background) is descended from the wild Canadian species. The Embden goose (center), developed in Germany, is pure white and is bred quite extensively. The Gray African breed (two, right) has become popular in America.



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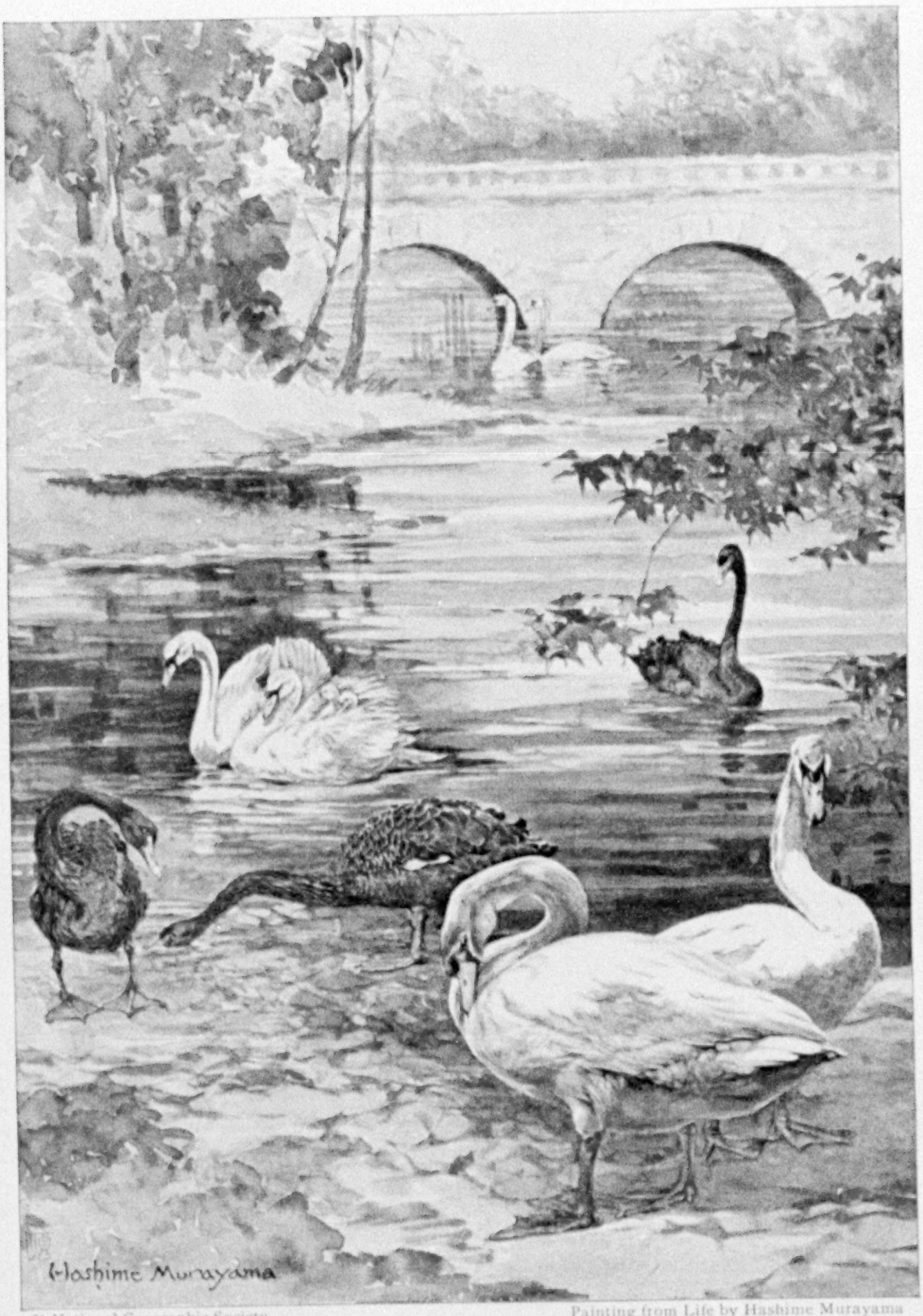
TOULOUSE, BROWN CHINESE AND WHITE CHINESE GEESE

The Toulouse (two, left), of French origin, is the first to have been established as a breed and at present is one of the most popular. The two varieties of the Chinese breed, Brown and White, seem to have originated in China.



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BLACK AND WHITE SWANS

The swan is one of the most beautiful of all waterfowl. The two color varieties are descended from one of the European wild species and have more gracefully curved necks than any of the American species. The swan is used extensively to adorn ponds and lakes on private estates and in public places.

enlarged livers. During the first part of the fattening period the feed is given in troughs, but for some days before the geese are to be killed they are forcibly fed, a funnel-like apparatus being used to force the nourishment down the birds' throats. The forced fattening of geese is depicted on mural reliefs in one of the tombs at Sakkara (Egypt).

In France it used to be the custom to fatten geese in casks, in which holes were bored to allow the fowls to put their heads through for feeding and watering. The process used by the Poles in early times was to place each goose in an inverted earthenware pot large enough to accommodate the victim comfortably. After being fattened for even two weeks many of the geese could be removed only after the pots had been broken.

The livers, which become enlarged to an almost incredible size, are sold separately and command a good price. In Germany, in particular, goose liver is served in a variety of ways. In Strasbourg and in other places the livers are prepared for the table in the form of pâté de foie gras, a delicacy to tickle the palate of the epicurean.

DOMESTIC BREEDS OF GEESE

The domestic breeds of geese that have descended from the wild Graylag goose are relatively few in number, and they do not vary much in type, nor is there such diversity of color pattern, as in the case of ducks. Concerning the goose, Darwin states that "hardly any other anciently domesticated bird or quadruped has varied so little." Other than breeds descending from the Graylag, there are only two recognized as standard, the Egyptian and the Canadian.

The domesticated Egyptian goose (see Color Plate XIII) is descended directly from the wild Egyptian goose and has the same color pattern. The Egyptian is the smallest of all domestic breeds.

The Sebastopol (see Color Plate XIII) is not recognized as a standard breed in the United States, although it is widely distributed in countries bordering on the Black Sea and in Hungary, where it is known as the Danubian Rippled goose. The chief characteristic of this pure white bird is the wavy condition of its plumage.

The domesticated Canadian, or Canada, goose (see Color Plate XIV) is a counterpart of its wild progenitor. The standard weights are: adult gander, 12 pounds; young gander, 10 pounds; adult goose, 10 pounds; young goose, 8 pounds.

The Canadian goose is sometimes used to cross with domestic stocks, the "blood" of the former being much in evidence in many of the geese imported into the United States from the Maritime Provinces of Canada.

The Embden, a pure-white breed (see Color Plate XIV), originated in Hanover, Germany, but it seems to have been improved considerably in England. It is bred extensively in England as well as in all parts of Europe.

In western Germany the Embden was sometimes referred to as the Bremen and as such was imported into the United States in 1820. Later Embden importations were made from England.

The standard weights of the Embden are: adult gander, 20 pounds; young gander, 18 pounds; adult goose, 18 pounds; young goose, 16 pounds. Because of its size and its white plumage, the Embden is particularly well adapted for market purposes.

The Gray African goose (see Color Plate XIV), in spite of its name, appears to have come from China.

One of its outstanding characteristics is the presence of a well-developed knob at the base of the bill. There is also a prominently developed fold of pendulous skin, called the dewlap, under the throat.

The standard weights are: adult gander, 20 pounds; young gander, 16 pounds; adult goose, 18 pounds; young goose, 14 pounds.

In the early part of the nineteenth century large gray geese were being bred extensively in France in the Toulouse district. They came to be known as Toulouse geese (see Color Plate XV), and were exported to England, Ireland, and other countries, where, in some cases, they were improved considerably. To-day the Toulouse is probably the most popular breed in America, as well as the largest, the standard weights being: adult gander, 26 pounds; young gander, 20 pounds; adult goose, 20 pounds; young goose, 16 pounds.

Because the Chinese goose (see Color Plate XV) has a different body structure

Photograph courtesy L. E. Cline

NEVADA TURKEYS HARVESTING STANDING WHEAT

This method provides for reduced labor cost, insures feeding on uncontaminated ground, and makes for plumper birds than those usually fed on alfalfa. In the Middle Western and Southwestern States large numbers of turkeys are raised on the grain farms.

Photograph by Associated Press

NEW JERSEY "SAYS IT WITH TURKEYS" TO AN AMERICA IN HOLIDAY HUMOR

Prize birds such as these raised on a farm near Freehold are being fattened for the literally groaning boards of the Nation's best-loved feast day.

Photograph by Lynwood M. Chace

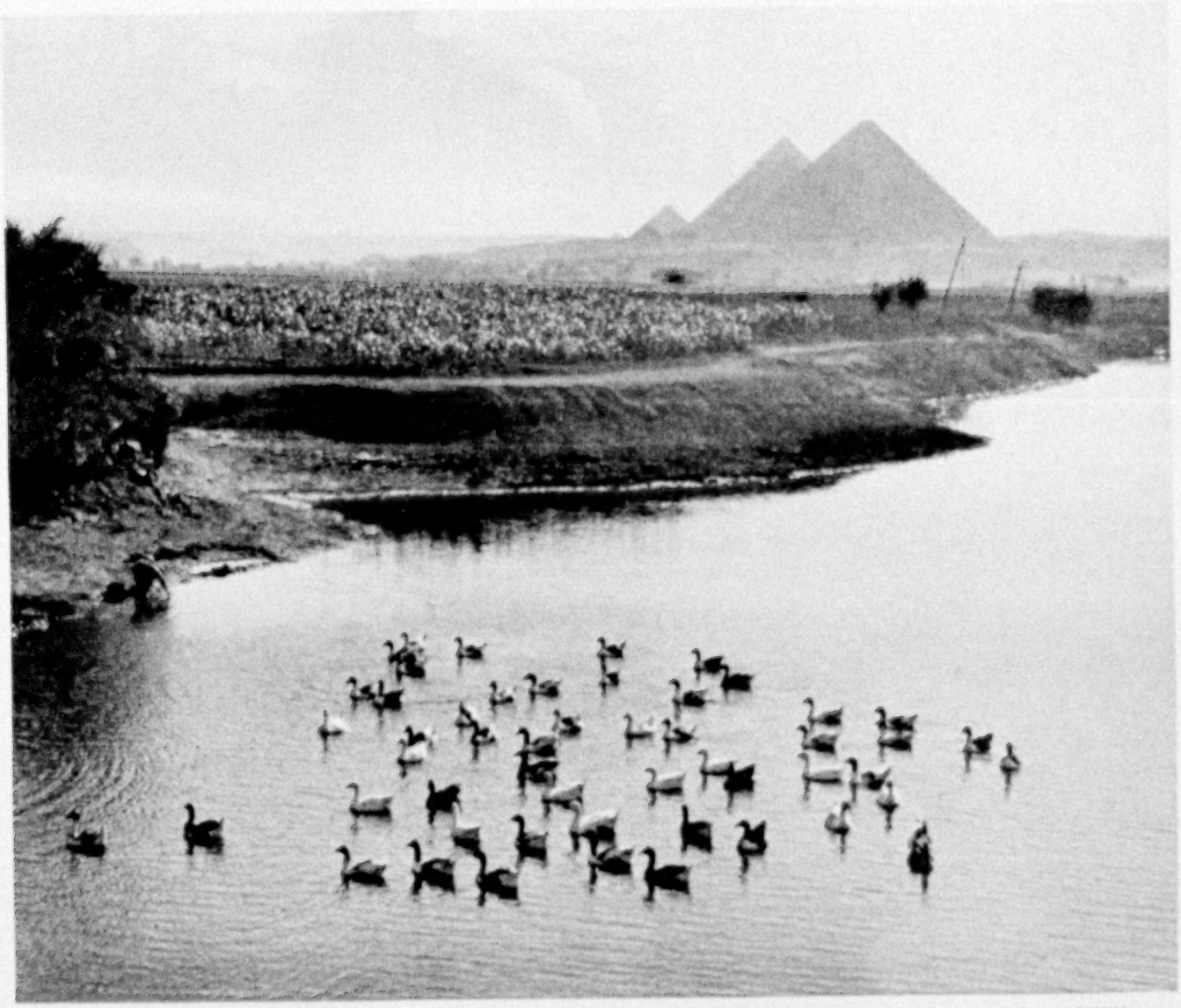
DIVING FOR HIS LIVING

The Canadian goose "tipping up" to get a morsel of food from the shallow bottom of the pond. Some 5,000 of these birds are bred in the United States each year for the ornamentation of private and public parks and for use as decoys by hunters. The wild ganders are frequently crossed with certain species of domestic geese to produce the so-called "mongrel goose," whose meat is of fine quality.

and is more upstanding than other domestic breeds and has a prominently developed knob at the base of the bill, together with a dewlap under the throat, it was long regarded by naturalists and early poultry writers as a distinct species. It crosses readily with other domestic breeds, the progeny being fertile, and by this test is regarded as having descended from the wild Graylag species. That this should determine its real origin does not follow, however, because the Canadian goose crosses readily with domestic stocks, the progeny being fertile, in so far as is known.

"The earliest record of Chinese geese in America," says John H. Robinson, "is in the correspondence of George Washington, and was first published in Haworth's 'George Washington—Farmer,' in 1915.

"It discloses that in 1788 he received from Gouverneur Morris two Chinese pigs and with them 'a pair of Chinese geese, which are really the foolishest geese I ever beheld; for they choose all times for setting but in the spring, and one of them is even now (November) actually engaged in that business.'"



Photograph by Maynard Owen Williams

TO EGYPTIANS GEESE HAVE LONG BEEN AS FAMILIAR AS THE PYRAMIDS

They were regarded as sacred 4,000 years ago, and, chickens possibly excepted, were probably the first birds domesticated (see, also, text, page 349). The forcible-feeding process was also known to the Egyptians, for it is pictured on the mural reliefs in the tomb of Ti at Sakkara (see, also, page 361). Cranes as well as geese were fattened in this way.

TURKEYS

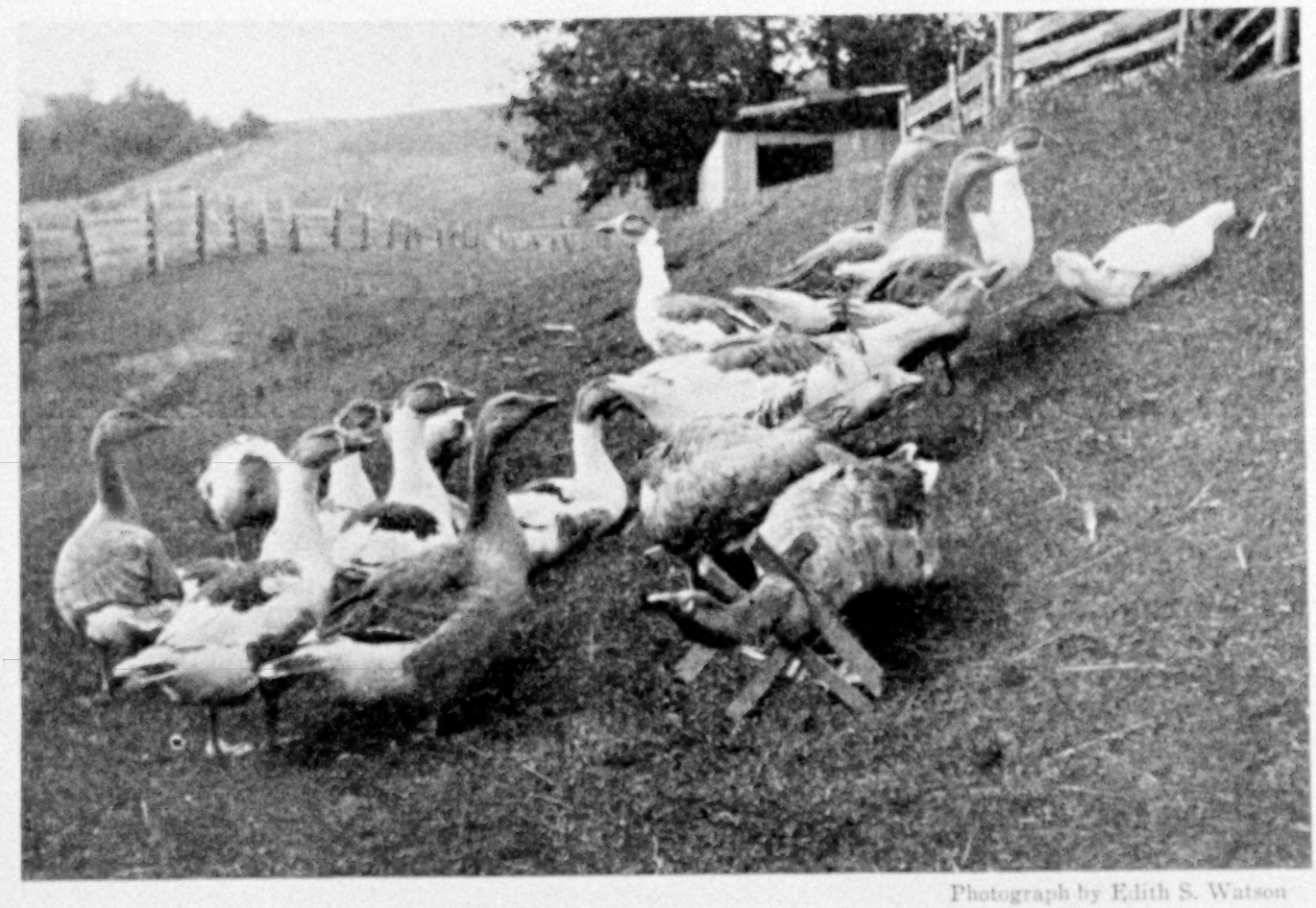
It is interesting that one of the largest wild game birds which has been domesticated should become known as "The National Thanksgiving Bird" of various countries. Such is the rôle the turkey has played for many decades.

As a wild bird in North America, the turkey supplied the numerous tribes of Indians and the early white settlers with "game" fowl in great abundance, whereas in later times the domesticated turkey has provided kings and presidents, as well as the more lowly in rank, in various nations with a class of meat that has come to be regarded as essential in the proper celebration of certain holidays.

The turkey is the only race of poultry that originated in the United States. When Francisco Fernández, under the patronage of Philip II of Spain, arrived at the northern coast of Yucatan in 1517, turkeys were observed to have been domesticated by the natives. In 1518 Grijalva discovered Mexico and found domesticated turkeys in great numbers. Gómara and Hernández refer to wild as well as domesticated forms.

Various Indian tribes fed freely upon turkey meat, obtained from both wild and domesticated flocks. The Aztecs were more inclined to domesticate the turkey than the northern Indians, but all tribes hunted the wild birds.

The flesh was not the only part of the turkey used by the Indians. Feathers



Photograph by Edith S. Watson

IN CANADA THE GOOSE MAY WEAR A "RUFF"

In parts of rural Quebec and other provinces, a wooden yoke is sometimes put around the neck of the gander, as leader of the flock, to keep the birds from slipping through the fences and robbing a neighbor's grainfields. Nova Scotia and Prince Edward Island raise many geese for the Boston market.

served to adorn the wearing apparel, and they were also made into robes and blankets, being twisted separately into strands of wild hemp and then woven together.

In its original habitat the wild turkey ranged from the Atlantic coast to as far north as the Dakotas, and from southern Ontario to southern Mexico. It was not a native of the three Pacific Coast States, nor of Idaho, Montana, Utah, Nevada, and Wyoming.

With practically a whole continent for his home, the more favored haunts of the wild turkey were the forests and brush lands, where food was abundant and there was some protection from natural enemies. He fed on acorns, seeds, berries, grass and insects, especially grasshoppers.

The clearing of the forests and brush lands for agricultural purposes and the shooting of thousands of birds by hunters were two of the most important factors contributing to the gradual retreat of the wild turkey from Northern and Eastern States.

It is still to be found in Arizona, New Mexico, Kentucky, Tennessee, Pennsylvania, Maryland, Arkansas, Colorado, Oklahoma, Missouri, Mississippi, Louisiana, Alabama, Georgia, Florida, Texas, Virginia, West Virginia, and Mexico. Various State game departments are reintroducing the bird, and restocking depleted areas.

WHENCE CAME THE NAME?

Although there is no doubt that the wild turkey originated in America, there is much doubt as to how it got its name. Some early writers have suggested that the name "turkey" was adopted because of the supposed resemblance between the adornments of the fowl's head and the fez worn by Turkish citizens. But the most widely accepted explanation is that the name bears some resemblance to the bird's repeated call-notes—*"turk, turk, turk."*

The turkey is not a migratory bird in the sense that ducks and geese migrate

Photograph by Pacific and Atlantic

THE PEKIN IS THE FOUNDATION OF LONG ISLAND'S DUCK INDUSTRY

This fast grower is raised for commercial purposes to the exclusion of almost all other breeds (see text, page 340). They are timid birds and easily frightened, and therefore strangers are usually discouraged from visiting the farms. Their feathers are used extensively in making cushions, pillows, and mattresses. Feeding time on a Pekin farm at Speonk, Long Island.

hundreds of miles from the south to the north in the spring and return in the fall, much to the delight of thousands of hunters.

The wild turkey is a handsome bird of stately carriage. His glossy plumage is mostly greenish bronze, with gold and coppery reflections. In the sunlight the effect is a delight to the eye. The feathers of the neck, breast, body, and back are tipped with a band of velvety black, thus accentuating the glowing sheen of the remainder of the plumage.

One outstanding characteristic of the turkey is that the upper portion of the neck and the head are bare of feathers, the skin being rich purple or blue. The folds or lumps of bare skin are called caruncles. There is a single wattle, and from the crown of the head there hangs a pencillike projection of the skin, which reddens when the gobblers make love to the hens.

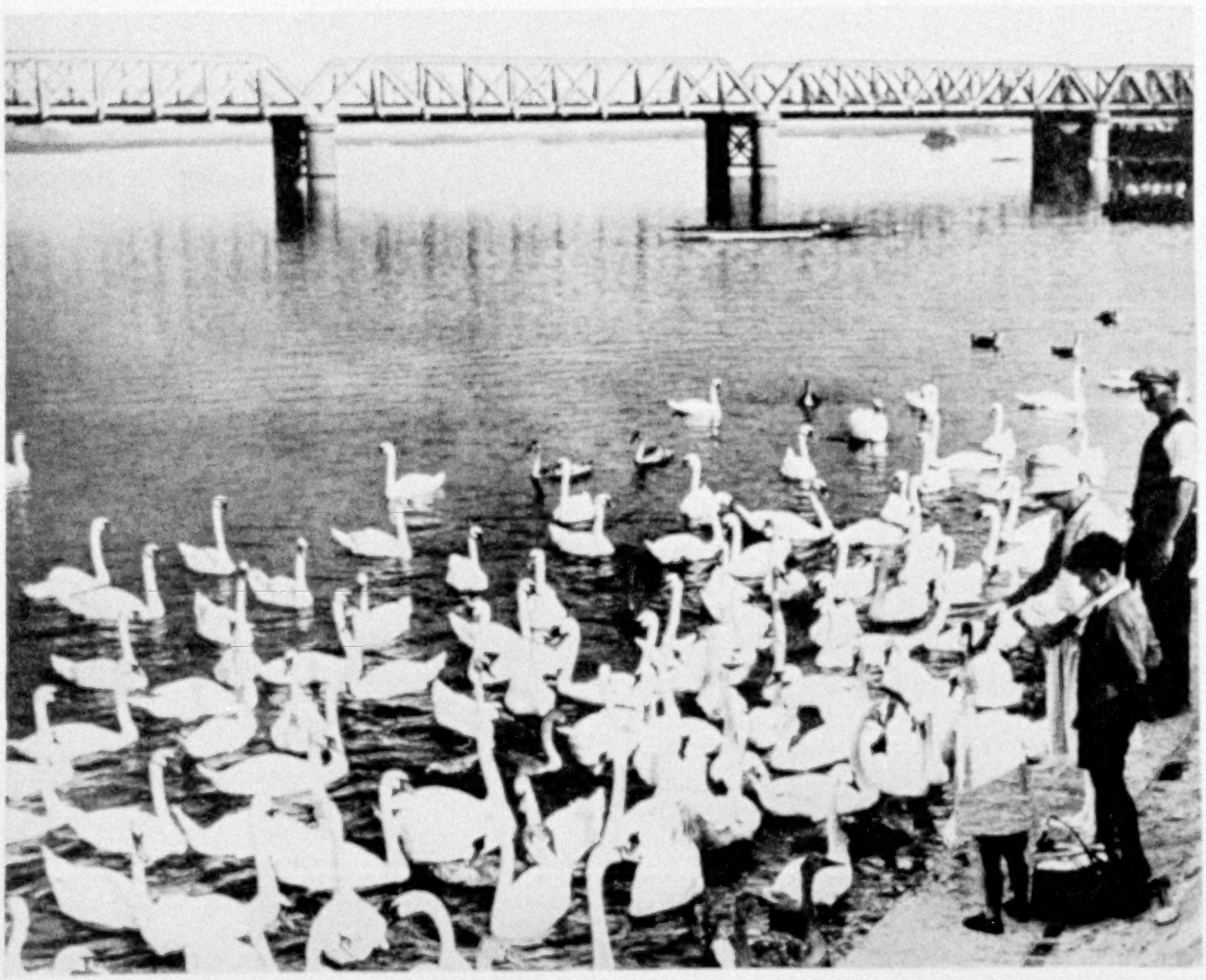
Another outstanding character of the turkey is the tuft of wiry, hairlike "beard" springing from the center of the breast. In some old male wild turkeys the beard trails to the ground.

The feet of the wild turkey are light purple. They are equipped with short, heavy spurs, but while the male chicken fights principally with his spurs, the turkey fights almost entirely with his beak.

The wild gobbler is provided with an interesting appendage, which is not found on the females or on young gobblers. John James Audubon, writing in 1831, speaks of it as the "breast sponge," and it serves a very important function. In the spring, during the gobbling season, this sponge is filled with fat and serves to sustain the bird; he usually eats little while strutting, gobbling, and otherwise making love to the females.

As the mating season advances the gobbler usually becomes quite thin, as the reservoir of fat is used up.

There is no pairing off in couples, as in the case of many other wild birds, for the wild turkey male is polygamous in the



© Henry Miller

THE "SWAN SONG" OF WEYMOUTH

One of the noteworthy sights at this English south-coast watering place is the vast number of swans which inhabit the river and lakes in the vicinity. They have become quite tame and upon the approach of a visitor they immediately put in an appearance to beg for food.

extreme and loves a large harem. Bitter fights among the old males are common, the victor claiming the harem of the vanquished. The defeated male must perforce seek battle with another for the possession of another flock of females, or he is obliged to join a group of disconsolate "bachelors."

The females select secluded spots for their nests and make a slight depression in the ground, into which a few dry leaves are scratched. From eight to fifteen eggs, somewhat smaller and more pointed than those of the domestic varieties, are laid.

After four weeks of incubating, the baby turks, or poults, appear, covered with gray down, dotted with dusky spots, and with two dusky stripes running from the top of the head down the sides of the back. The down is soon replaced by feathers, which are replaced by another coat of feathers when the birds molt. The molting season begins in August, and by the latter part of December all of the old feathers have been replaced by new ones.

The young gobbler acquires his "beard" in the center of the breast by November and it continues to grow rapidly until the third year, and thereafter more slowly.

The young turkeys receive the care of their mother until they are four or five months old, after which they look after themselves. At six or seven months of age the young gobblers separate from the young and old hens and range by themselves. The old gobblers also range by themselves, usually in flocks of about fifteen. The sexes roost apart.

This large and magnificent wild bird has always had numerous enemies, such as the fox, coon, mink, skunk, wolf, lynx, and coyote. Its bird enemies include owls,

Photograph by Clifton Adams

SNOWY SWANS ENHANCE THE TIME-MELLOWED BEAUTY OF OLD ENGLAND

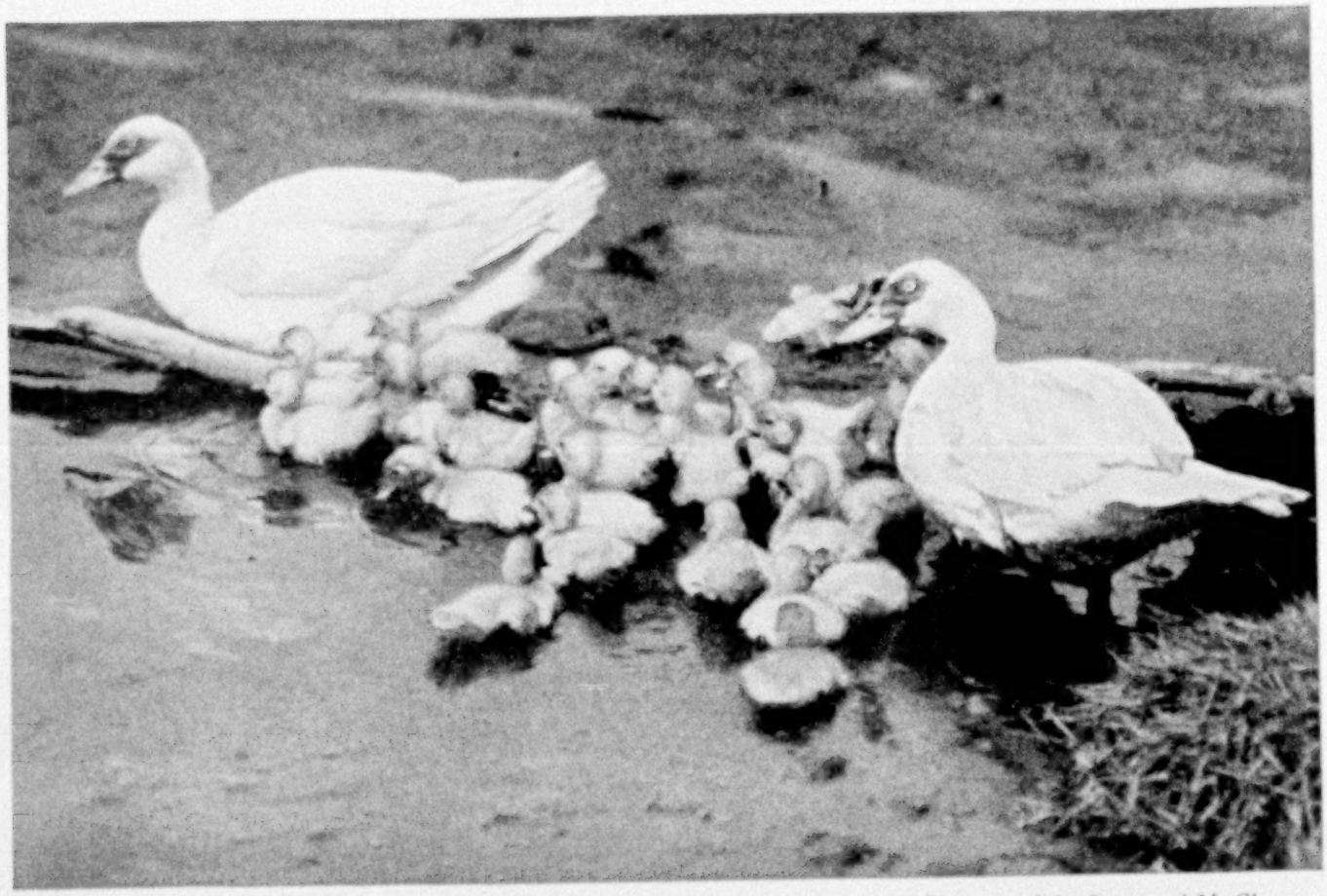
This pair is swimming at Ightham Mote, a charming manor house in a Kentish village southeast of London. Portions of it, with the moat, date from the 14th century. There is a tradition that Richard Cœur de Lion introduced the swan into England.

eagles, and hawks. As Edward A. McIlhenny says, "There is never a moment in the poor turkey's life that eternal vigilance is not the price of its existence." Not only must the turkey be on guard every hour of the day, but it must also seek roosting places that are more or less inaccessible to its natural enemies. For this reason turkeys favor trees growing in shallow water, which seems to provide some protection from night prowlers.

In early colonial days wild turkeys were very numerous in Massachusetts, and at the beginning of the nineteenth century they could be purchased for 6 cents each, while large birds, ranging from 25 to 30 pounds, sold for 25 cents. When Cortez first visited the capital of Mexico, "no less than 500 turkeys, the cheapest meat in Mexico, were allowed for the feeding of the vultures and eagles kept in the Royal aviaries."

The turkey was first introduced into Spain in 1519 by Francisco Fernández. From that country it spread throughout Europe and England, being introduced into the latter country in 1524. There is a verse to the effect that:

> "Turkeys, carps, hoppes, picarel and beer,
> Came into England all in one year."



Photograph by Lynwood M. Chace

WHITE MUSCOVY YOUNGSTERS TAKE THEIR FIRST DIP

These South American birds are bred chiefly as curiosities. The bare skin about the eyes and base of the bill makes them look savage, but in reality they are fairly docile and free from shyness. Their natural color is black, with some parts broken with white. The all-white is an albino variety.

That the domestic turkey was still relatively rare in 1541 is emphasized by the fact that in that year "Archbishop Cranmer prohibited the appearance at State festivals of more than one dish of turkey cocks; the female was too precious to be cooked at that period. Fourteen years later two turkeys and two turkey poults were served at a grand law dinner. Twenty years afterwards the turkey became a Christmas dish with the farmer."

According to Konrad von Heresbach, the turkey was introduced to Germany in 1530. The first mention of the bird in Italy was in an ordinance issued by the magistrate of Venice in 1556, "repressing the luxury of serving turkeys." In 1570 Bartolomeo Scappi, cook to Pope Pius V, published receipts for cooking turkey.

In recent years dressed turkeys have been imported into the United States from Hungary, Russia, Austria, and Ireland, and large numbers come from Argentina. Such is the irony of fate; being indigenous to the United States and existing here in countless numbers, the wild turkey was domesticated and later taken to other countries, from which it is now imported in the "dressed" form.

In Texas, Colorado, and the Dakotas many flocks of a thousand or more birds are raised annually. Frequently these large flocks are herded on the prairies in much the same manner as are sheep and cattle.

From the original wild stocks man has developed a number of useful varieties which differ largely in respect to plumage color. There are six standard varieties recognized by the American Poultry Association: the Slate (Color Plate VIII), the Bourbon Red (Color Plate VIII), the Black (Color Plate IX), the Narragansett (Color Plate IX), the Bronze (Color Plate X), and the White Holland (Color Plate XI).

The Ronquières, a little-known variety bred in Belgium and France, is worthy of more attention than it has received.

THE GUINEA FOWL

(*For illustration, see Color Plate* XII)

Of all the breeds and varieties of domestic poultry, the guinea fowl is the only one that had its origin in Africa. The best account of it is by Prof. Alessandro Ghigi, who concludes that the guinea fowl as known to-day has descended from a West African species known as *Numidia meleagris*, rather than from an East African species, *Numidia ptilorhyncha*, as suggested by Darwin.

The two species can be crossed, the progeny being intermediate and unlike those of the domestic guinea fowl. Moreover, experience has shown that the East African species is an erratic form difficult to domesticate, whereas the West African species is sedentary by nature.

The West African species was brought to Europe by the Portuguese toward the end of the Middle Ages. Though it had been known to the Romans, it had not survived the fall of the Roman Empire and there are very few statements regarding it in medieval literature.

The Romans regarded the meat of the guinea fowl as a delicacy. In Greece the bird was used for sacrificial purposes, rather than for food. The Greeks probably imported it from Cyrene or Carthage.

The distant explorations of the Portuguese and Spaniards, conducted by Bartholomeu Diaz, Vasco da Gama, and others, led to a reintroduction of the western species, but up to 1600 it had not reached Italy for the second time.

The Portuguese called the imported fowl *pintada* (painted bird). The same name was taken over by the Spaniards and the French, *pintada* and *pintade* respectively, whereas the English called it "Guinea fowl," or the fowl of Guinea. To the Italians it is the *gallina di Faraone*.

There are three domestic varieties—the Pearl, the White, and the Lavender—the last of which is probably the result of a cross between the first two. The Pearl variety is by far the most common and is the direct descendant of the West African species. The White is probably a "sport" from the Pearl variety.

Guinea fowls are bred in many countries and are highly prized for the delicate quality of their flesh.

SWANS

(*For illustration, see Color Plate* XVI)

Black and White swans were domesticated more for man's pleasure than for economic value, although the down is very soft and in early days was highly prized for stuffing cushions and pillows. The quills taken from the wing feathers were often used in making pens and as tubes in which to place messages carried by pigeons.

The skins of swans were formerly sold extensively as a source of supply of down and in some cases were used as "chest protectors." The records of the traffic in swan skins in America reveal only too clearly the decrease in the number of wild swan from decade to decade.

There are some eight or ten species of swan, including three prominent European species, two American species, the Black swan of Australia, *Chenopsis atrata*, and the Black-necked White swan of South America, *Cygnus nigricollis*.

The Mute swan, *Cygnus olor*, breeds throughout Denmark, in southern Sweden, northern Germany, central and southern Russia, on the lower Danube, and eastward through Siberia and Mongolia. Its winter range includes the greater part of Europe and as far south as Algeria and from the Caspian region to northwest India. It is pure white and has a long, slender neck and a knob at the base of the bill. Most of the domesticated white swans in Europe and probably most of those in America are descended from the Mute swan. This is the species shown in Color Plate XVI.

The Whooper swan, *Cygnus cygnus*, is a European white species, sometimes referred to as the Whistling swan, which is also listed as an American species, *Olor columbianus*. These two have a wide range. They are pure white and do not have a knob at the base of the bill.

The Trumpeter, *Olor buccinator*, an American species, is pure white. It inhabits interior North America from the Mississippi Valley westward and northward over Ontario and Hudson Bay territory. It breeds from Wyoming to the Dakotas and winters from Washington State to southern California, Arizona, and the Gulf of Mexico.

XUM

APPROACHING WASHINGTON BY TIDEWATER POTOMAC

By Paul Wilstach

Author of "Holidays Among the Hill Towns of Umbria and Tuscany" and "The Stone Beehives of the Italian Heel," in the National Geographic Magazine

IN STARTING to explore the Potomac River, there are two points of departure. One is the point of departure of our interest, and the other is the point of departure of our trip.

Interest in the Potomac is on the march instantly one realizes that it is the river of Washington; of Washington the man, the greatest figure of our national history, and of Washington the city, the capital of the Nation, the focus of our national administration, and the city of our history in the making.

And our interest is accelerated as we realize that the old river presents other great names of celebrities who lived on the plantations along its shores: the Lords Baltimore, who planted the first settlement of Maryland, near the river's mouth; the Calverts, the Lees, the Carters, the Hansons, the Stones, the Fitzhughs, the Masons, the Mercers, and the Fairfaxes.

A DIVERSITY OF POTOMACS

The point of departure of the trip, however, appears at first less simple. There seem to be several Potomacs.

There is fresh-water and there is tidewater Potomac. The former is all that water coming down from the mountains and over the Falls above Washington City.* That water is soon lost in the brine of tidewater Potomac, which extends from the point of mingling to the mouth of the river, at Chesapeake Bay. Here strong tides rise and fall, sometimes more than three feet about the wharves of Washington. Here, too, the water is briny. It is so impregnated with the salt of the sea that, even at the head of tidewater, steamer captains dare not introduce it into the boilers of their ships. This briny reach is really not a river; it is an arm of the Chesapeake.

Then there is the surface Potomac and a secret river hidden in its depths. The surface waters express themselves in broad reaches between banks of engaging loveliness. They vary in width from one to seven miles. The hidden river is often only a few hundred feet wide, and unseen it serpentines its way back and forth from one shore to the other in a way that teases and often wrecks the inexperienced mariner. It is called "the channel." Up it ocean-going vessels of considerable size come to the docks of Washington City.

If the sources of the fresh water which comes down from the mountains over the Falls were to dry up, and thus the Potomac above the Falls were to cease to exist, it would not mean the drying up of Tidewater Potomac. The channel at least would remain, shallower by only a few feet, and it would still permit the ocean-going vessels to reach Washington harbor.

It is in Tidewater Potomac that one finds the river of the greater interest, the Potomac of history, of the landings, of the old plantations, of the celebrities who have made it one of the most distinguished rivers in America.

Curiously, the better way to see this river is not to start where it appears to begin, and so float down on its currents to where it ends in merging with the bay; but rather to start where it ends and be carried up by its tides and by that interesting tide of its history which entered here, at its mouth, three hundred years ago.

ICELAND, SPAIN, AND ENGLAND CONTEND ABOUT THE POTOMAC

The story of this trip up the broad reaches of Tidewater Potomac is actually a composite of many trips, by many kinds of land and water craft, but here, for brevity's sake, reduced to its simplest terms without the inconvenience of delays, whether of boat schedules or motor trails, without the disappointments of weather or of the many futile side trips which anyone must make in order to find out where are the points of genuine interest and how to reach them.

* See "The Great Falls of the Potomac," by Gilbert Grosvenor, in the National Geographic Magazine for March, 1928.

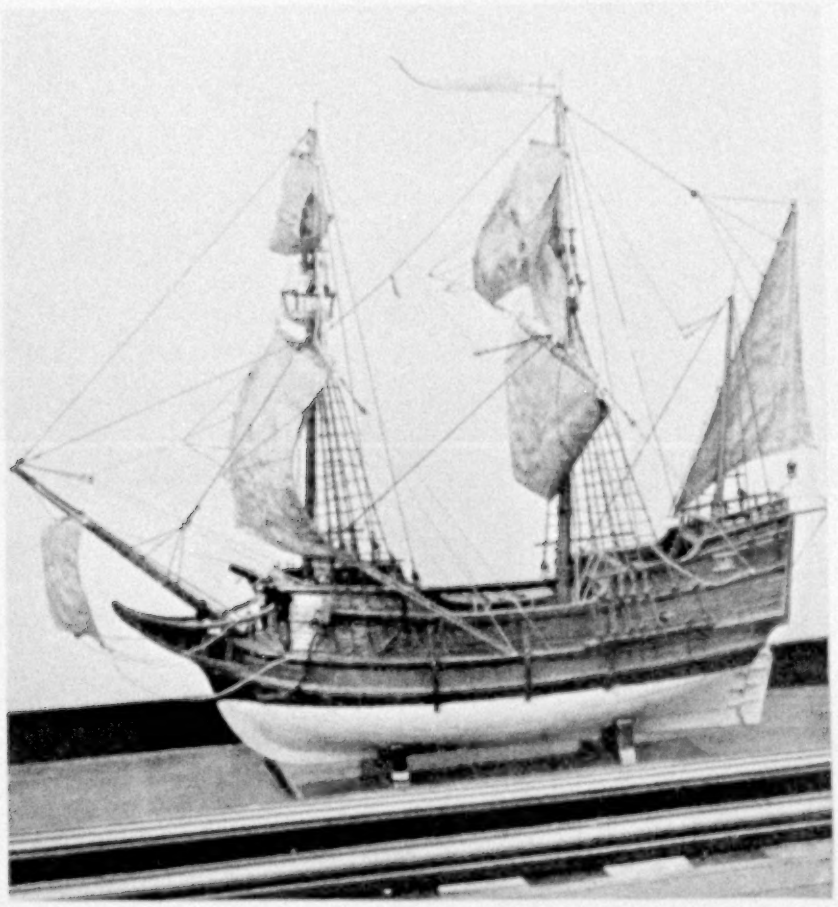
Approaching the mouth of the river, one speculates on such questions as, who was the first white man who ever came into it, where did the river get its name, and where in it is the dividing line between Maryland and Virginia?

The last question troubled the dwellers on both shores for more than 250 years. Then, in 1877, a commission of arbitration finally placed the waters of the river wholly within the boundary of Maryland. The actual boundary line between the two States is low-water mark on the Virginia side; but the citizens of both States have equal fishing rights in its waters.

The name Potomac is Indian. The first explorers found a tribe of that name living on the river's shores; but one cannot be quite sure whether the tribe took its name from the river or the river took its name from the tribe. It is now generally accepted that Potomac is the Indian word for Traders; hence the Potomac River means the River of the Traders.

Who was the first white man to enter the river is a question less easily answered. At one time a claim was set up, based on "a runic inscription" said to have been found below the Falls, for "an Icelandic widow buried here in 1051." Rather more credence has been given to the claim that Spanish explorers, known to have come into the Chesapeake between 1565 and 1570, sailed up the Potomac as far as Occoquan. The contention is based largely on the appearance of the place name Axacan in the Spanish chronicles and its assumed identity with Occoquan.

There is better evidence that an English explorer may have been in the river before 1585, for its existence at least was known at that date, as revealed by a map published in London in that year, on which Tidewater Potomac, though unnamed, was sketched in with recognizable lines. But how did the map-maker get his sketch—at first hand, on a visit to the river, or at second hand, from descriptions from the Indians?



Photograph by James F. Hughes Company

"THE GOOD SHIP CALLED THE 'ARKE'"

The largest of Maryland's *Mayflowers* was a ship of something more than 300 "tunnes"; the *Dove*, a pinnace, was 50 tons. In comparison, the *Sarah Constant*, the *Goodspeed*, and the *Discovery* of the Jamestown settlers were vessels of 100, 40, and 20 tons respectively. The *Mayflower* was a craft of about 180 tons. This model of the *Ark* is owned by the Maryland Historical Society, in Baltimore (see page 374).

CAPT. JOHN SMITH FISHED WITH A FRYING PAN

As we sail into the mouth of the river, however, we are reminded of the first white man definitely known to have sailed into these waters. On our left, the south lip of the mouth of the Potomac, is Smiths Point, named for the original authenticated white pioneer here, the gallant explorer, Capt. John Smith.

Smith came to the James River in 1607, and the next spring, "as soon as corn was planted," he sailed up the bay to explore and spent some time visiting much of Tidewater Potomac.

Smith really put the Potomac on the map, for it was on his chart that the name first appeared, and in connection with this

Photograph by Clifton Adams

CHESAPEAKE BAY IS THE WORLD'S GREATEST OYSTER GROUND

These delicious bivalves are also found up the Potomac as far as Popes Creek, 45 miles from the river's mouth and about 55 miles below Washington. The oysters taken at this point, however, are used only for seed, as the water is too fresh to produce any of marketable size. Ten miles below, however, they are sufficiently large for market purposes. Dinner-time on a schooner at Cambridge, an oyster center on Maryland's Eastern Shore.

trip, two of his companions told the first fish story associated with the river.

"We found that abundance of fish lying so thicke with their heads above the water, as for want of nets we attempted to catch them with a frying pan; but we found it a bad instrument to catch fish with. Neither better fish, more plenty or variety, had any of us ever seene in any place, swimming in the water, but there not to be caught with frying pans."

ST. MARYS, LORD BALTIMORE'S CAPITAL, HAS DISAPPEARED

Having come to this conclusion, it is interesting to find that when, by reason of the ebb tide, his boat was left aground on the channel bank, the captain started "sporting himself to catch them by nailing them to the ground with his sword." He set all his companions to fishing in this original way, and they "tooke more in an houre than we all could eat."

A few years after Smith, in 1634, there came into the river two other ships, the *Ark* and the *Dove*, with Lord Baltimore's colonists to found Maryland, on the north side of the Potomac. Even now we can feel these pioneers' cautious apprehension in an unknown wilderness inhabited by savages. They did not at first trust themselves to the mainland; they sailed up the river for 31 miles, until they came to a small island, now called Blakistone Island, where an attacking enemy might at least be seen.*

Here Lord Baltimore's brother, Leonard Calvert, left the *Ark*, and in the *Dove* and another boat, procured in Virginia, sailed up into the narrower reaches, where, at Piscataway, just opposite the hilly banks where later rose Mount Vernon, he found

* See, also, "A Maryland Pilgrimage: Visits to Hallowed Shrines Recall the Major Rôle Played by this Prosperous State in the Development of Popular Government in America," by Gilbert Grosvenor, LL. D., Litt. D., in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1927.

the Indian emperor, with whom he wished to discuss a site for his colony's capital.

Calvert found only Indians on the river. Their occasional towns were indicated by the clearings in the forests, where they raised their corn and tobacco. In one such town dwelt those Potomac Indians who gave their name to the river or perhaps took it from the river. They dwelt in an inlet called Potomac Creek. The town and the Indians have long since disappeared, but Potomac Creek still bears that name, and all train travelers between Washington and Richmond cross it and may look down its picturesque vista out on the wide river beyond.

Each of the Indian towns had a king and collectively they owed allegiance to the old emperor on the Piscataway.

It is not known precisely what that imperial party said to Calvert, but obviously it was something so poisonous that the newcomer couldn't settle far enough from that Indian. He returned to his ships and sailed them into the last inlet on the northern side of the river, just ten miles above its mouth.

This beautiful body of water he called St. Marys River, and there he began to build his capital, which he called St. Marys City. Within 35 years St. Marys City was laid out with streets and a square and, in addition to its frame and log structures, it had more than 60 brick buildings, which included the Statehouse, the Governor's mansion, churches, public office, private dwellings, and commercial buildings.

TWO FAMOUS MARYLAND HOMES

To-day not one of the buildings of old St. Marys survives; not a trace of one of them. The visitor finds grain and tobacco fields, a few green pastures, and a graveyard where the first Maryland lawmakers sat in the midst of the sprightly colonial life of their capital city.

Where the plow has turned over the soil, or where a well or cellar has been dug, a few bricks have come to the surface, the only physical vestige of the brick capital of 300 years ago. Those from Maryland's first Statehouse have been used in building little Trinity Church on a part of the site of the vanished city.

Among the hospitable homes on St. Marys River one finds at least two of enduring interest. One is Cross Manor, its original lines somewhat obscured behind a modern veranda, still standing on the shore of St. Inigoes Creek, across which in the early days it looked at the busy capital city. It is the oldest house in Maryland, and was built by Deputy Governor Thomas Cornwaleys in 1642.

In another direction is Cartagena, a modest little brick house which has a double attraction. It illustrates an old custom of the colonial planters here, on the lower Potomac, who sometimes put their initials in glazed brick headers in the front walls of their houses. On the sides of the front door of Cartagena we find a W and an H, the initials of William Hebb, who built here early in the eighteenth century.

When a young man, Will Hebb joined the British expedition fighting in the West Indies under Admiral Vernon. Among his companions were the sons of several other Potomac families. One of them was a lad whose family lived across the river in Virginia, in Westmoreland County. His name was Lawrence Washington.

When, after the war, these young men came home to the Potomac, Will Hebb named his house Cartagena, after the siege of that city in which they all participated, and Lawrence Washington, having married and built himself a house up near the head of tidewater, named his estate, after their commander, Mount Vernon.

SURVIVALS OF 17TH CENTURY LIFE ON THE POTOMAC

Except for the curious and complete disappearance of St. Marys, one finds that life at the mouth of the Potomac presents surviving phases which were familiar there in the 17th century. Tobacco, which once was the currency and paid all the bills, is still a staple crop and continues to pay a goodly percentage of the bills.

As in the beginning, so now, the tobacco casks are seldom hauled—"carried" is the local word—to the landings for shipment. They are even now oftener rolled along the roads by hand. The first roads here were private clearings from the tobacco barns, in the fields, down to the ship landing, over which the hogsheads were rolled to the vessel; from which these first roads were called "rolling roads."

In spite of Maryland's great advance in road-building and its vast motor traffic, one finds yoked oxen still dragging the plows across the fields and still hitched to hay wagons and wood wagons on their way down to the wharves.

Up many a creek one finds the skeleton of an old mill. In the early days every plantation had its mill, where the planter ground his corn for johnnycake and batter bread, and ground his wheat for flour for the English market, and made his mash for domestic articles now prohibited by a certain celebrated amendment.

Adjacent to these old mills we still find mossy-banked mill ponds, often reaching inland far out of sight. However much they may resemble upland mill ponds, they were fed on a different principle. Here, for the first 50 miles from the mouth of the Potomac, land is almost on a level with the water, and hence there are almost no streams to feed such ponds. Whence, then, the source of the supply of water for them? Their water all comes from the sky. The ponds are really open-air reservoirs of rain water preserved for release over the great wheel as the occasion demands.

SHAD FISHING ON THE POTOMAC AT NIGHT

In the inlets, which are numerous in Tidewater Potomac, nearly every one of them sheltering one or more landings served by the Baltimore and Washington steamers, we find the Potomac terrapin in his native lair, the oyster tongers busy at the richest yield of this district, and the fishermen spreading their nets—nets often so vast as to require a gas engine to land them—for the river's generous yield of rock and herring and shad.

But one has not seen the most picturesque feature of the Potomac fisheries who has not seen shad fishing at night. The nets are laid for every run of the tide, by night as well as by day. By day the line of huge corks sustaining the nets across the channel is easily seen and avoided by passing steamers. At night these same reaches of nets would be invisible were it not that the "gillers," as fishermen are called on the Potomac, have extra-large floaters at both ends of each net and on them make fast lighted lanterns.

To look across the broad waters of the river on nights when the shad are running is to mistake the vision for a bit of Venice, a fairy city twinkling in the darkness.

When we sailed from St. Marys River, over the seven miles of water to the opposite Virginia shore, we found at Lodge, on Yeocomico River, a family which has had an intimate contact with every single one of the 120,000,000 people in the United States. Father and son, they have for many years engraved the steel canceling stamps used in every post office, everywhere, under United States jurisdiction.

Zigzagging back to the Maryland side, one finds, at the head of Breton Bay, the little city of Leonardtown, named, of course, for the first governor at St. Marys. But that was a somewhat ironic compliment which Leonard Calvert died too early to sense. The transfer of the capital to Annapolis was the first drain on the life blood of St. Marys. The removal of the county seat from it to Leonardtown ended its last claim to life.

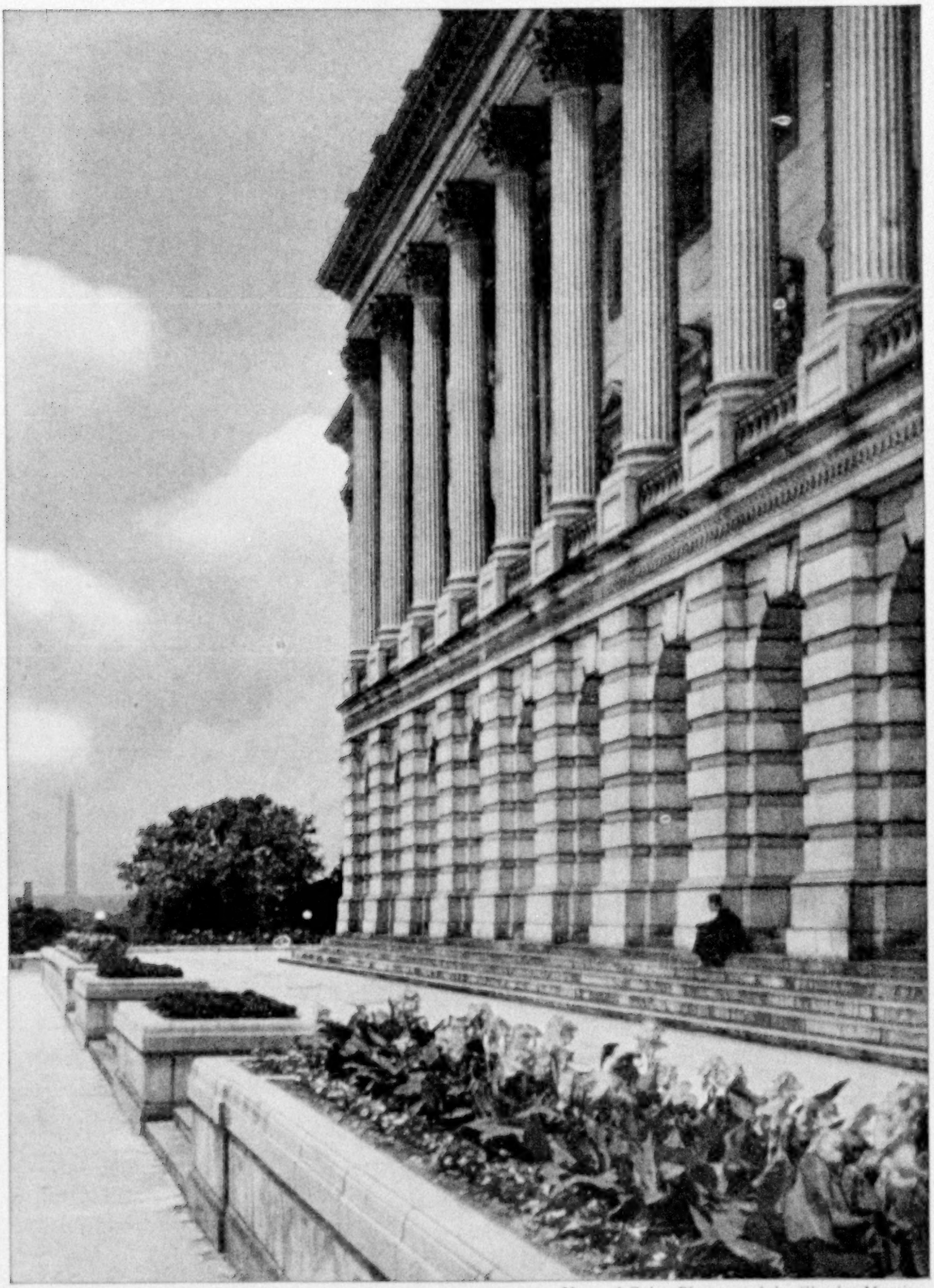
THE BIRTHPLACE OF THREE PRESIDENTS

As one sails out of Breton Bay the Virginia shore opposite, as far as the eye can see in each direction, is historic Westmoreland County. It has a distinction unrivaled by any other in America, for it was the birthplace of three Presidents of the United States—the first, the fourth, and the fifth—George Washington, James Madison, and James Monroe.

Here, in their many ramifications and over a period of more than 250 years, lived the great Carter, Lee, and Washington families. Here, though few survive, were some of the finest mansions of colonial America. The distinction of social and intellectual life in Westmoreland before the Revolution earned it the title of Athens of Virginia.

The most distinguished survival of all these old houses rises on the crest of Nomini Cliffs, 150 feet above the water, higher than any other land in Tidewater Potomac before the river narrows to the width of a single mile. It is called Stratford Hall and it is the ancestral seat of the Lee family.

The patent to the estate dates to the middle of the seventeenth century. The first considerable house was built here early in the eighteenth century, but fell



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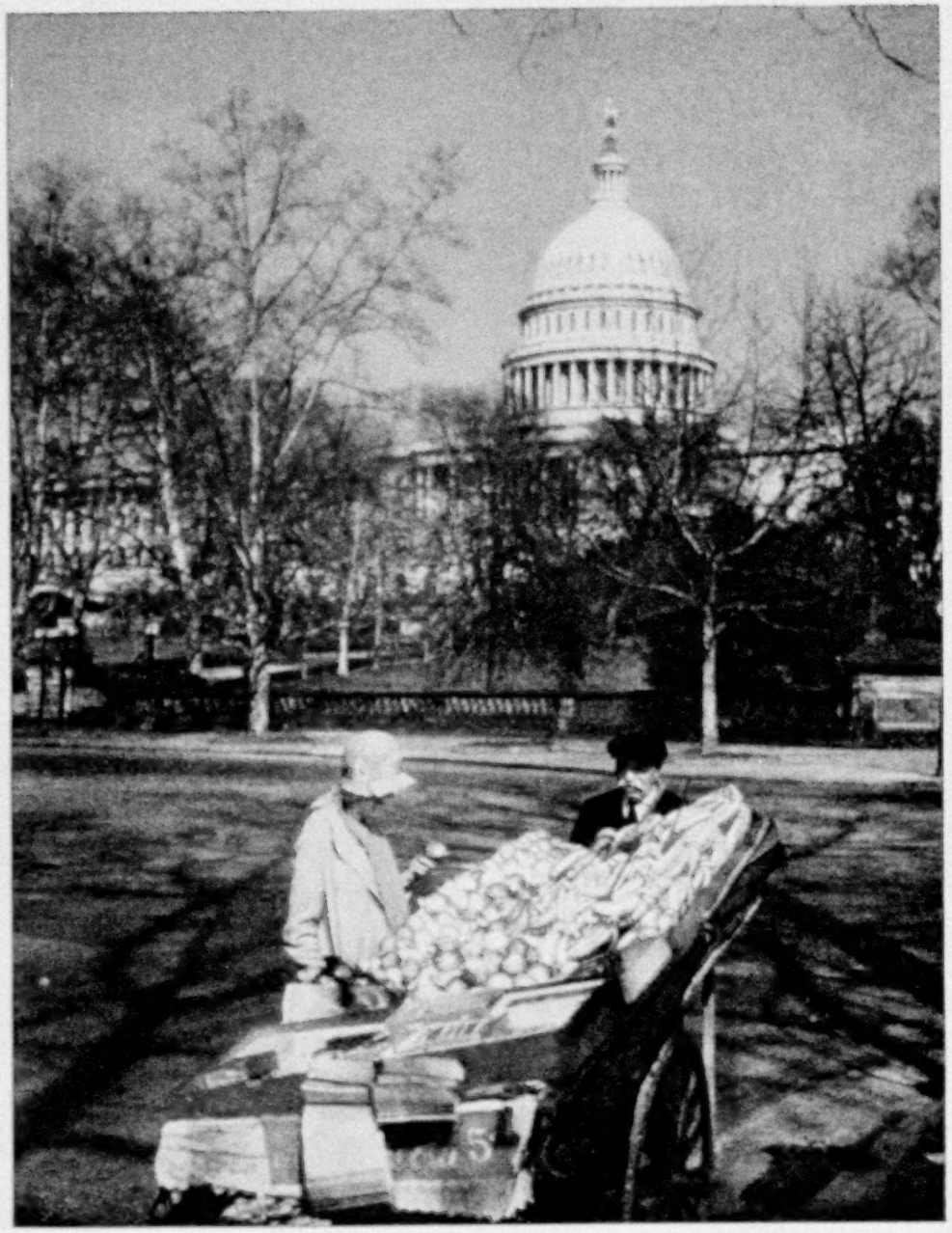
A FLOWER-BORDERED TERRACE OF THE NATIONAL CAPITOL

For more than a century this building has seen the seasons come and go and watched the growth of the Federal City from a mud-spattered village to one of the show places of the world. To the west the lofty obelisk of the Washington Monument and the towers of the Smithsonian Institution rise above the Mall's verdant sea.



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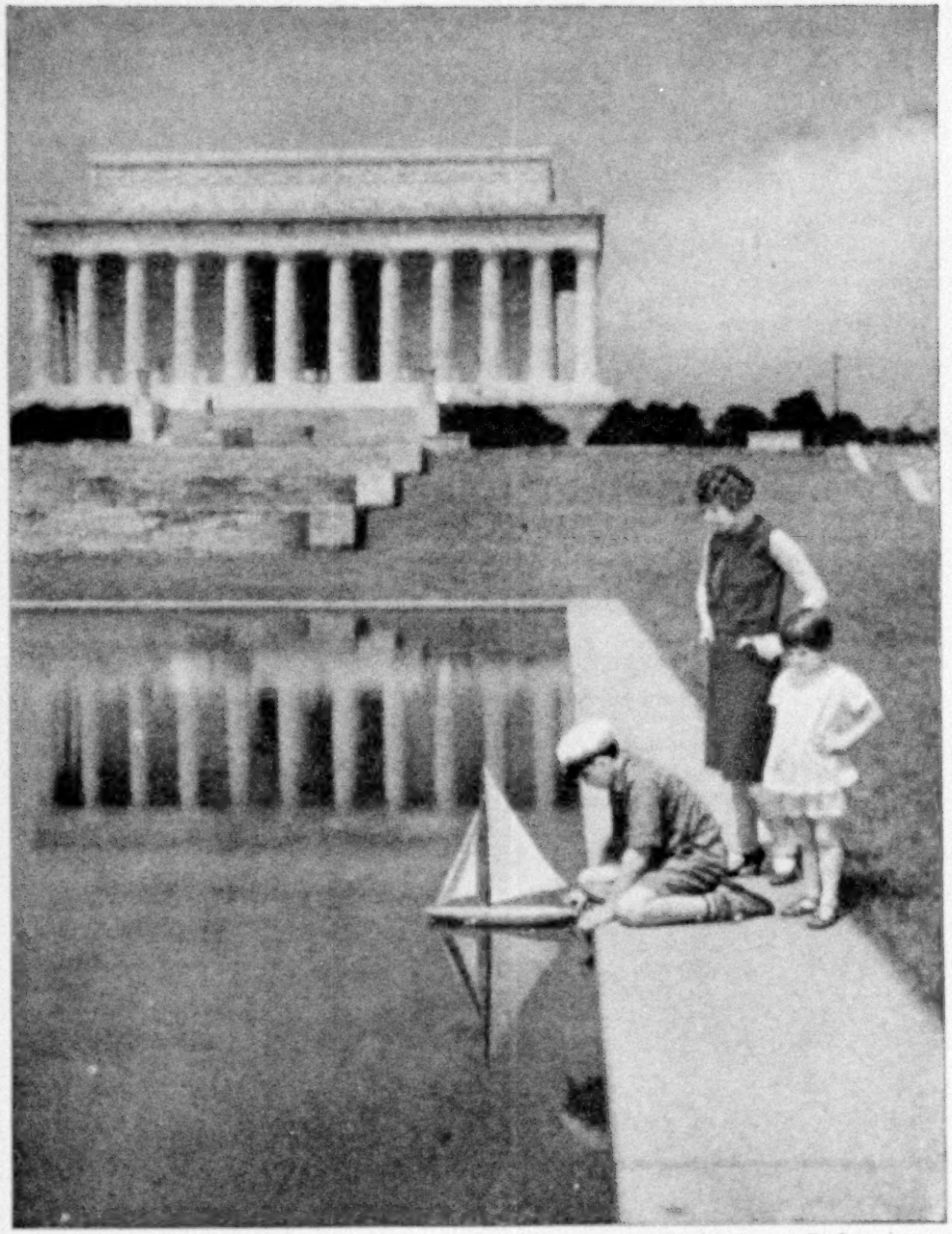
FRUIT AND FLOWER VENDERS LEND COLOR TO THE STREETS OF THE CAPITAL



Natural-Color Photographs by Orren R. Louden

SPRING DAYS LURE JUVENILE YACHTSMEN TO THE LINCOLN MEMORIAL REFLECTING POOL

© National Geographic Society Natural-Color Photograph by Clifton Adams

A SON OF THE NORTHLAND STANDS GUARD AT THE CANADIAN LEGATION

One member of the famous Royal Canadian Mounted Police is always on duty at the Dominion's recently established legation in Washington. The flag is out in honor of Queen Victoria's birthday, May 24, which is still observed in Canada.

Natural-Color Photograph by Edwin L. Wisherd

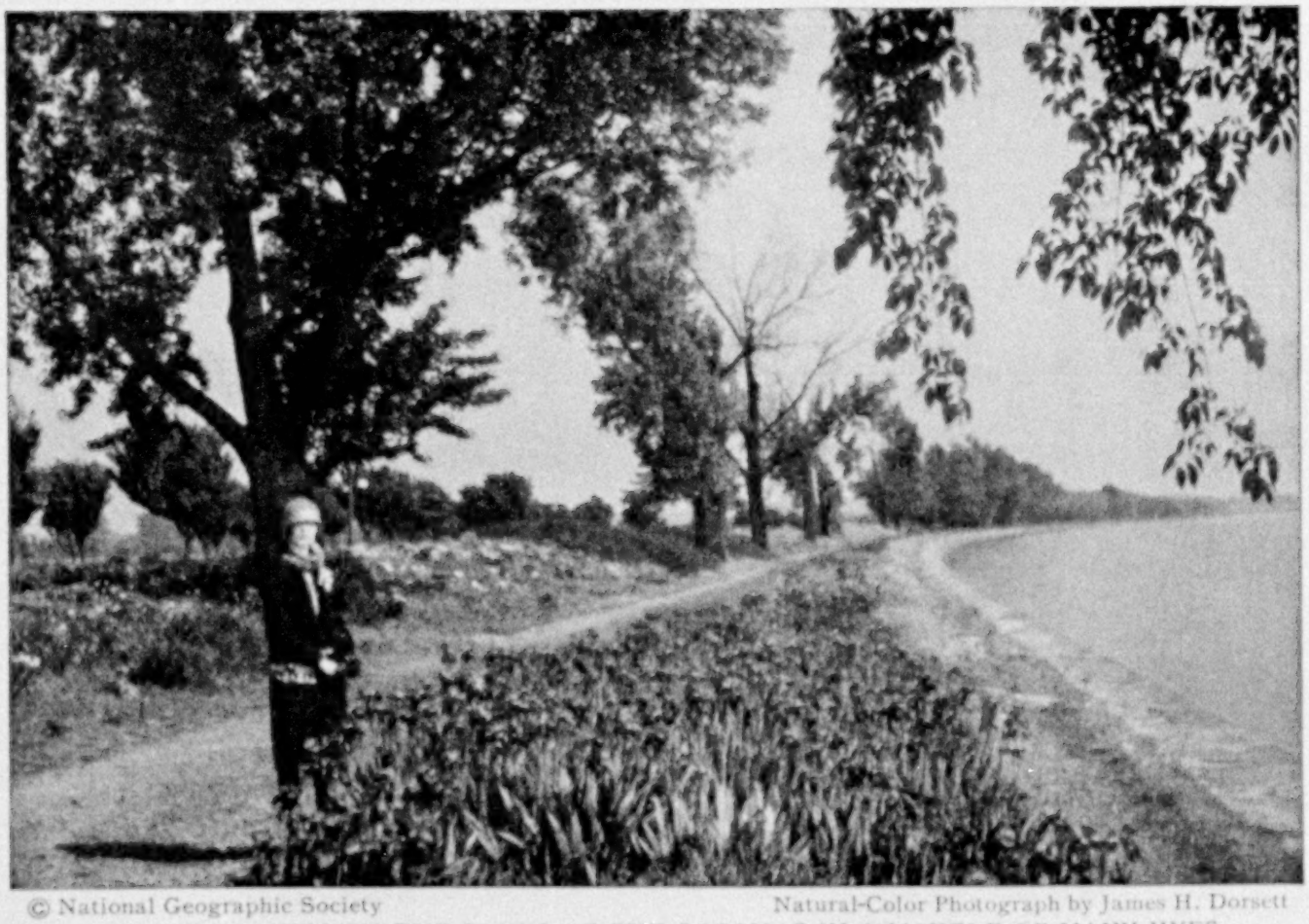
THE GREENERY OF DUPONT CIRCLE FRAMES A FOUNTAIN OF GRACE AND BEAUTY

Daniel Chester French, sculptor, and Henry Bacon, architect, collaborated to produce this memorial to Admiral Dupont of Civil War renown. The marble figures supporting the bowl represent the Wind, the Waves, and the Stars.

© National Geographic Society Natural-Color Photograph by Clifton Adams

SALVIA ADDS ITS SCARLET BLAZE TO THE ATTRACTIONS OF WASHINGTON'S PARKS

Large and small, there are 645 parks in the District of Columbia, covering an area of approximately 4,000 acres. They are centers of color and fragrance during the greater part of the year.



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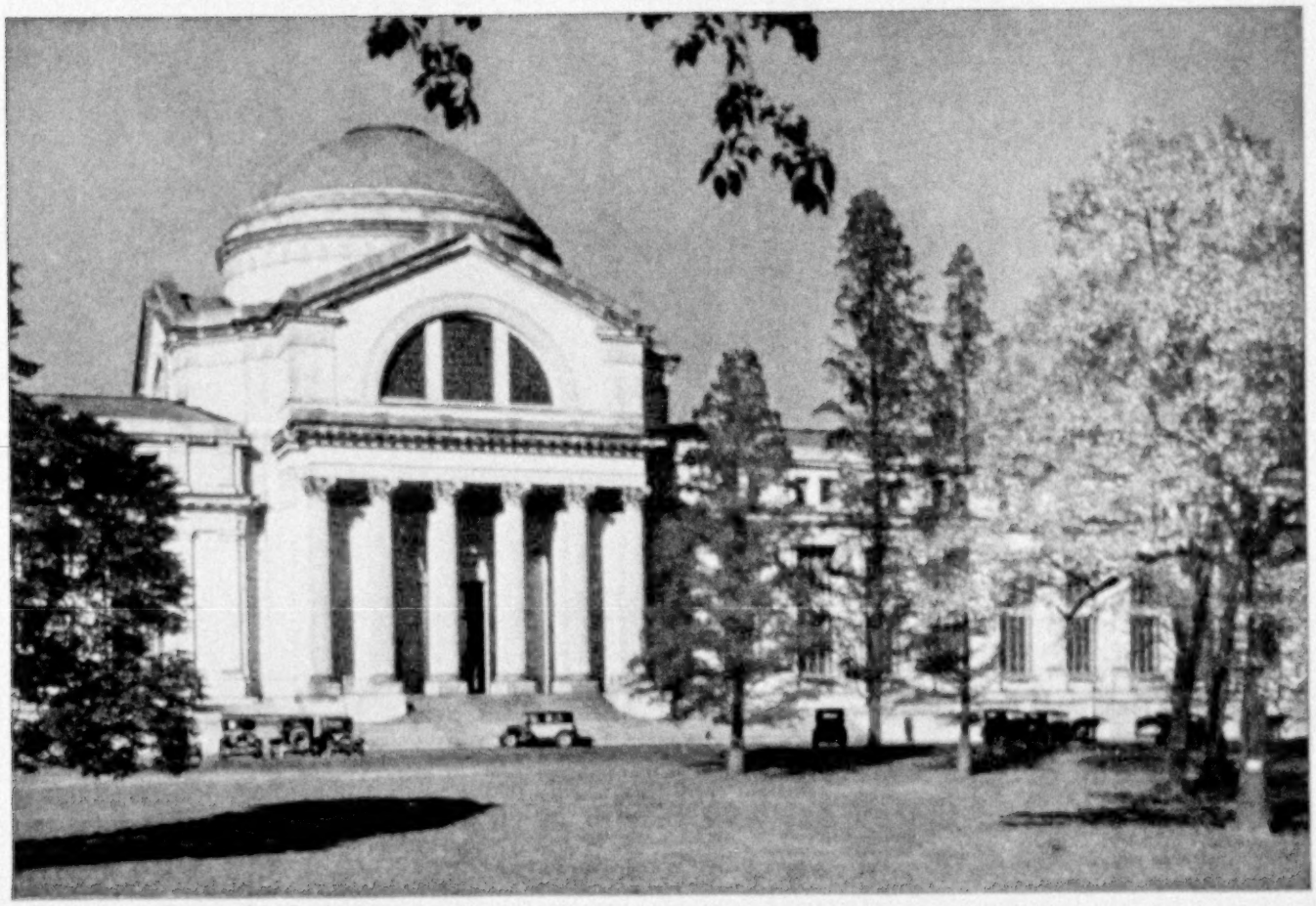
SPRING ARRIVES ON THE BANKS OF THE POTOMAC IN A MANTLE OF MANY HUES

Potomac Park is a land of enchantment at this season. Within its borders thirteen miles of smooth motor roads, nearly seven and a half miles of bridle paths, a newly completed waterside promenade for pedestrians, several golf courses and a polo field make an irresistible appeal to lovers of the outdoors.



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SCIENCE AND ART HAVE PROVIDED PRICELESS TREASURES FOR THE NATIONAL MUSEUM

Collections in the realms of natural history, ethnology, anthropology, archeology and numerous other fields, together with the nucleus for a National Gallery of Art, are safeguarded here.

© National Geographic Society Natural-Color Photographs by Charles Martin

RICH MEMORIES CLING TO SMITHSONIAN'S CASTELLATED TOWERS

More than a century ago the will of James Smithson, a wealthy Englishman, provided for the foundation of this institution, which has long occupied a position in the front rank of the American scientific world. Its activities are legion and include direction of the United States National Museum and Zoölogical Park.

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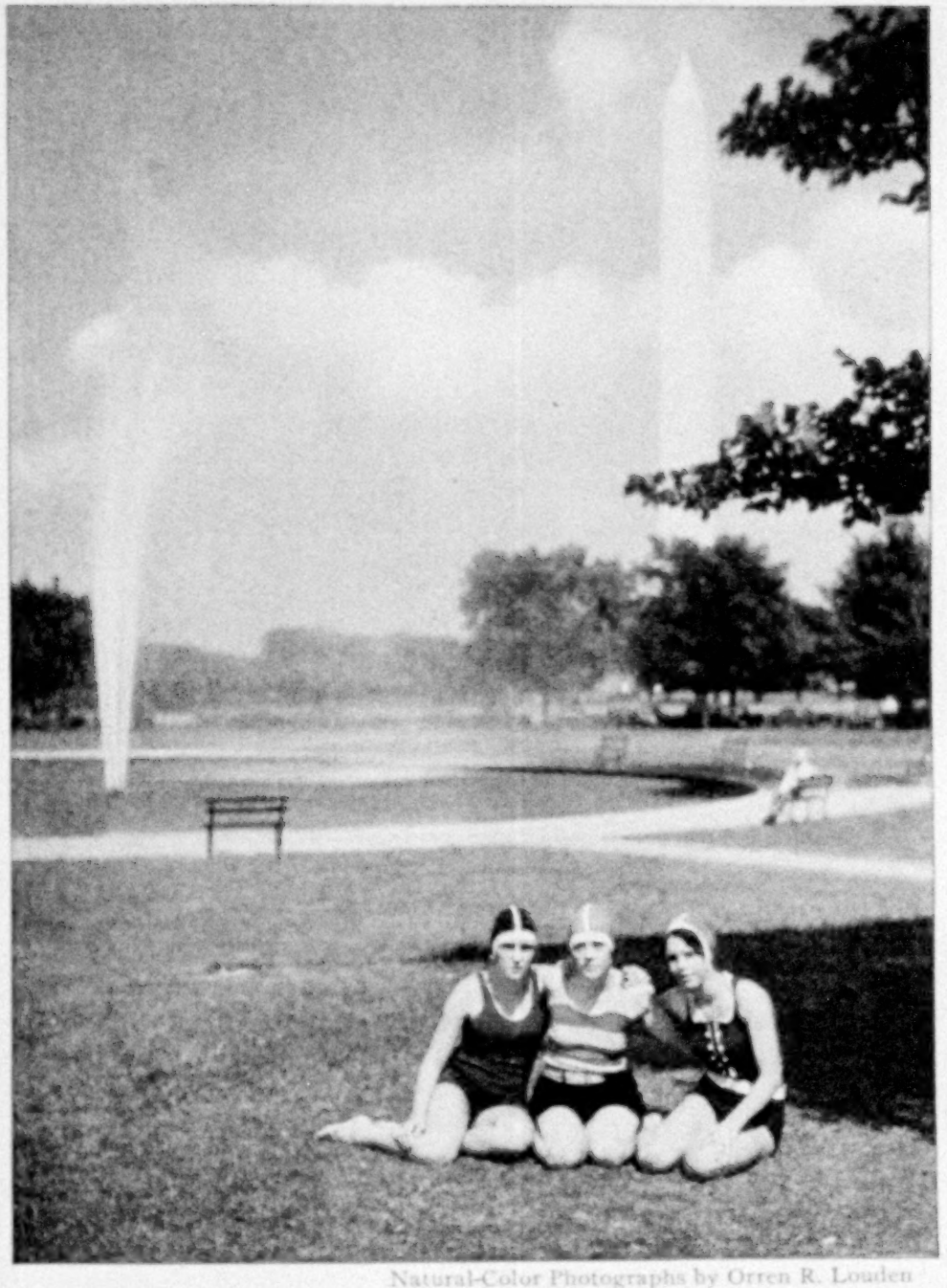
OUR NATIONAL CONSCIOUSNESS FINDS EXPRESSION IN THE NOBLE PILE ON CAPITOL HILL

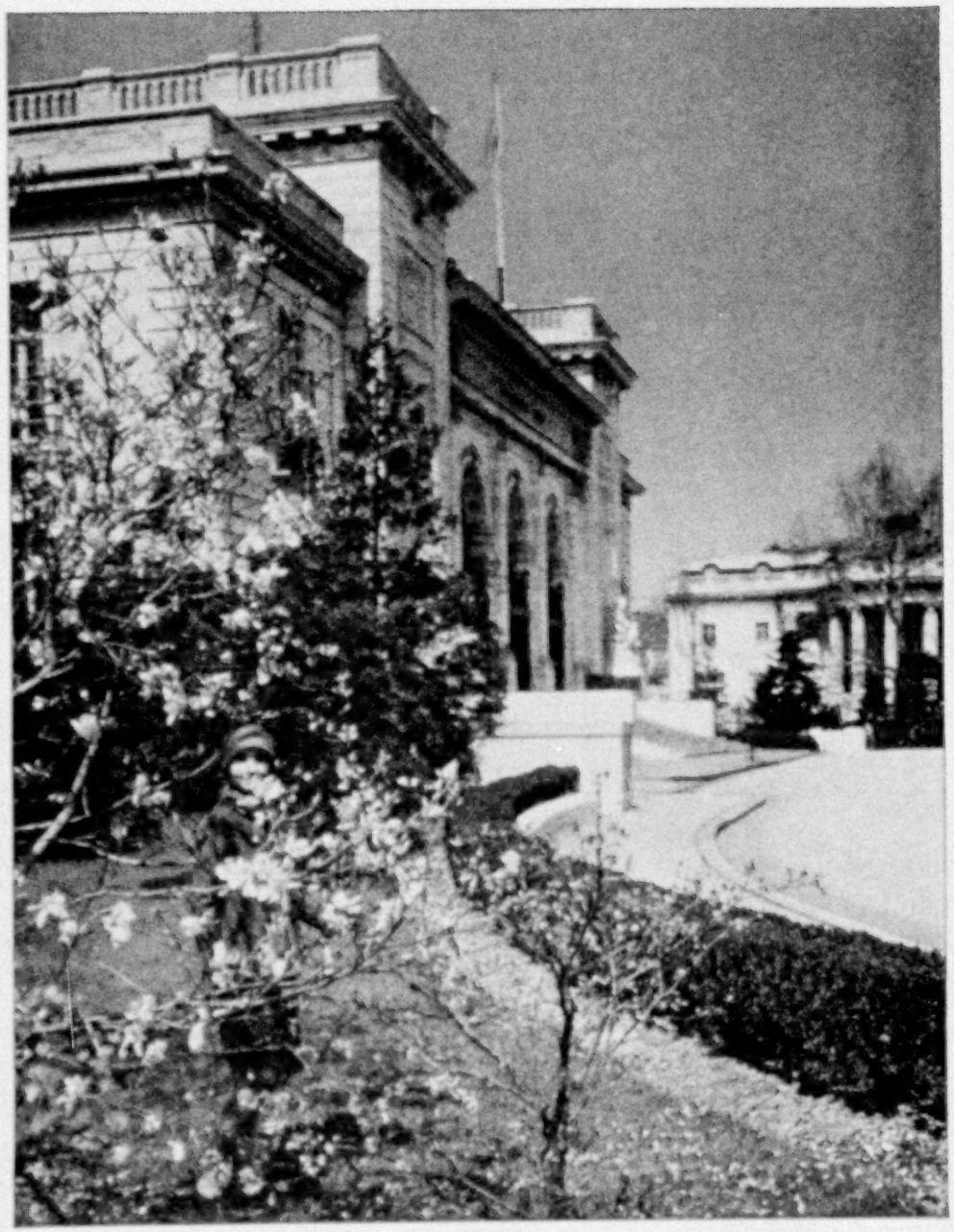
Acclaimed by many as the world's most stately edifice, the nerve center of the United States Government is appropriately situated in a fine 60-acre park on a crest overlooking the city.



Natural-Color Photographs by Orren R. Louden

SMALL BOYS HAVE NO MONOPOLY ON THE ENJOYMENT OF WASHINGTON'S FOUNTAINS

To supplement the city's bathing-beach facilities, in very warm weather fountains and reflecting pools are made available for the younger generation.



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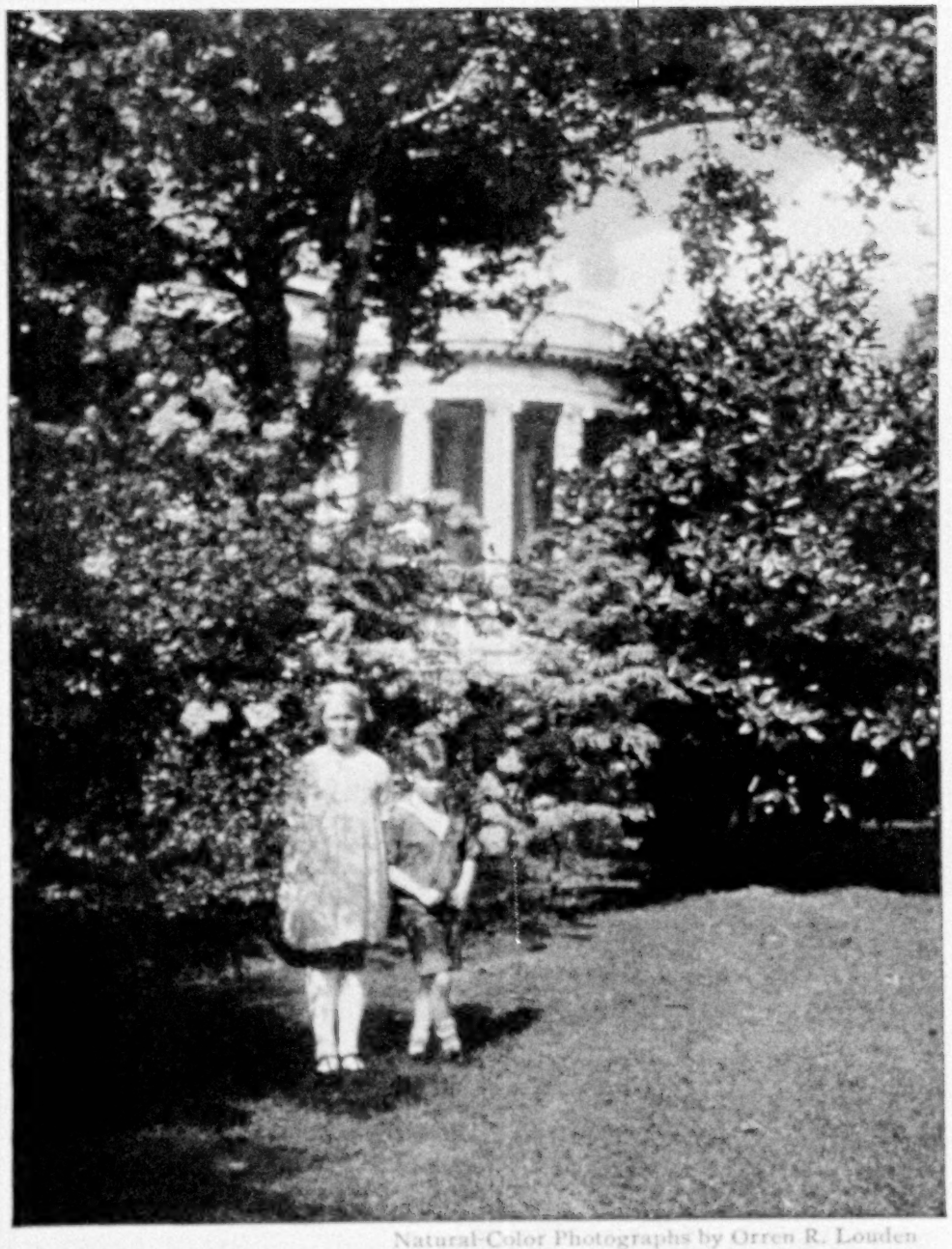
MAGNOLIAS ANNOUNCE SPRING'S ARRIVAL AT THE PAN AMERICAN BUILDING

This outstanding structure was built with funds contributed by the twenty-one North and South American Republics and by Mr. Andrew Carnegie.



Natural-Color Photographs by Orren R. Louden

VERDANT SETTINGS ENSHRINE A NATIONAL PALACE OF PATRIOTISM

In Memorial Continental Hall, headquarters for the Daughters of the American Revolution, the sessions of the Washington Conference on limitation of armament were held in 1921.

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EACH YEAR THE CHERRY BLOSSOMS RENEW THEIR PLEDGE OF FRIENDSHIP

A gift to the City of Washington from the city of Tokyo, these trees bespeak a message of amity more significant than many a treaty agreement. Mrs. William Howard Taft planted the first one and Viscountess Chinda, wife of the then Japanese Ambassador, the second. There are at present more than 2,000 of these living tokens of good will in Potomac Park.

© National Geographic Society Natural-Color Photograph by Jacob Gayer

THIS FLORAL DIADEM OF PINK AND WHITE IS THE SUPREME GLORY OF WASHINGTON'S SPRINGTIME

The annual blooming of the Japanese cherry trees along the Tidal Basin stands out as the finest natural display of the year and attracts tens of thousands of visitors to admire their delicate beauty.

the victim of flames about 1729. Thereupon the present huge pile was erected.

We found it about to celebrate its 200th birthday, still a notable structure, built as solid as a fortress; and, like a fortress, it was set in the center of a square, at the four corners of which were strong brick buildings, each united to the other by high and strong brick walls.

Here, at Stratford, lived a constant succession of distinguished men. The builder was the only Virginian who exercised the prerogatives of governor in absence of the royal appointee. Here, in one generation, in the middle of the eighteenth century, were born six Lee brothers, of whom two were members of the Virginia House of Burgesses; two others, Richard Henry Lee and Francis Lightfoot Lee, were signers of the Declaration of Independence, and another two, Arthur Lee and William Lee, represented the colony diplomatically in Europe. Though born farther up Tidewater Potomac, at Leesylvania, Gen. "Light Horse Harry" Lee, a relative, lived at Stratford, and here was born his son, the ranking Confederate general, Robert E. Lee.*

STRATFORD'S PRESERVATION ASSURED

Stratford has waited a long time for the public appreciation which it deserves; but such appreciation has reached it at last and in tangible and practical form. It is the latest of the historic colonial houses to be taken over for preservation against decay, for restoration to a semblance of its early character, and for maintenance as a national shrine to the memory of the great men who were born or lived there. Stratford is now the property of the Robert E. Lee Memorial Foundation, a national patriotic organization of volunteer workers with active chapters already established in nearly half of the States of the Union. The Foundation took title to Stratford on July 19, 1929.

Only five miles above Stratford is an estate called Wakefield, where George Washington was born on February 22 (new style), 1732. A monument has stood on this property, in commemoration of this fact, for many years. Otherwise the birthplace of Washington has been without recognition until the organization, a few years ago, of the Wakefield National Memorial Association, which has undertaken the restoration and care of this appealing spot.

In anticipation of the 200th anniversary of the birth of Washington, in 1932, the Wakefield Association has caused drawings to be made for rebuilding, as nearly as surviving evidence makes possible, the house which formerly stood on the ruins of the foundations near the monument.

Monroe was born on the creek next above, which now bears his name. Madison's birthplace is eight miles away, at Port Conway.

Crossing again to Maryland, the broad mouth of the deep bay called Wicomico River welcomes us. There are many to whom the Wicomico is known only as the one of the best duck-hunting reaches on the Potomac, so famous for its canvasback, redhead, and mallard; but, to anyone with an eye to them, the Wicomico has another kind of interest from the estates which flank it. On the estate called Bushwood lived the first of the family of Key who came to America, the great-grandfather of Francis Scott Key, author of "The Star-Spangled Banner."

A FASCINATING MIGHT-HAVE-BEEN

For one who cares to indulge his imagination, one of the most interesting spots on the river is the north lip of the mouth of the Wicomico. Here was the home of the Neales. Their name is not so well known to-day as it was some 300 years ago. At that time Capt. James Neale of the Potomac was a friend of King Charles I of England. His wife was a lady-in-waiting to Queen Henrietta Maria, who was godmother to one of the Neale girls. This, however, is only background to recalling how nearly the Potomac came to being the home of two of the conspicuous figures of 17th-century England.

Shortly after the English dropped the head of King Charles into the waiting basket, Sir William Davenant was appointed Lieutenant Governor of Maryland and had his passage engaged on a ship about to start for St. Marys, on the Potomac. This gentleman claimed to be no one less than the son of the great poet and

* See, also, "Virginia—A Commonwealth That Has Come Back," by William Joseph Showalter, in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1929.

Photograph by Gerard Hubbard

BOXWOOD HEDGES SCREEN THE GARDENS WHICH GAVE ROSE HILL ITS NAME

Dr. Gustavus Brown, one of the three physicians who attended General Washington on his deathbed, and the author of the remarkable letter to Dr. Craik (see text, page 387), grew the hedges at this mansion, near Port Tobacco, Maryland, in a design which is unique among all the estates along the Potomac.

dramatist, William Shakespeare. Actually booked to sail with him was Queen Henrietta Maria, the beheaded King Charles's widow, coming, it was said, to make her home here with her friends the Neales, on the Maryland shores of the Potomac. Neither of them came. Nevertheless, their plan provided an interesting might-have-been in the lore of the river.

Just ten miles above the mouth of the Wicomico the Potomac narrows, momentarily only, to a width of only one mile, and here Congress has authorized the building of a bridge. At present there is no bridge across the Potomac below Washington.

If ever this bridge is built, it will, in a general way, connect Popes Creek, the only place where a railroad reaches the Maryland side of the river below the capital, with the Virginia shore near the Naval Proving Ground at Dahlgren, where every gun destined for a United States naval ship is brought and tested before final emplacement.

Such a bridge would unite an almost due-north-and-south road from the National Capital to the city of Norfolk, across the four rivers of that region, so rich in history and natural beauty, known as Tidewater Virginia.

PORT TOBACCO, A DERELICT CITY

Farther ascending the river here, the stranger finds a confusing vision before him. The course up from Wakefield has been almost due north, but now there is a wide opening stretching to a watery western horizon. Which is Potomac, straight ahead or to the left? A passing steamer would answer that question, for it would swing round Mathias Point to the west on its way farther "up river." But we would miss one of the rich interests of the region if we did not steer straight ahead into what must then be another of the Potomac's numerous "creeks."

Such it is, its name is Port Tobacco, and at its head we find the remains of the colonial brick city of the same name, another of the vanished 17th-century cities of the Potomac.

Like St. Marys, the former Port Tobacco is a derelict, a ghost of its former self. But, looking up at the surrounding hills, one finds a circle of richly associated estates: Causine's Manor, St. Thomas Manor, Mulberry Grove, La Grange, Rose Hill, and Habre de Venture.

A FAMOUS PHYSICIAN'S LETTER ABOUT WASHINGTON'S LAST ILLNESS

La Grange and Rose Hill are two handsome, now somewhat gaunt, mansions, whose appearance seems to confirm the tradition that they were built in competition with each other. Another point of identity is that the competitive builders were fast friends, two physicians, who were both called to the bedside of General Washington in his last illness.

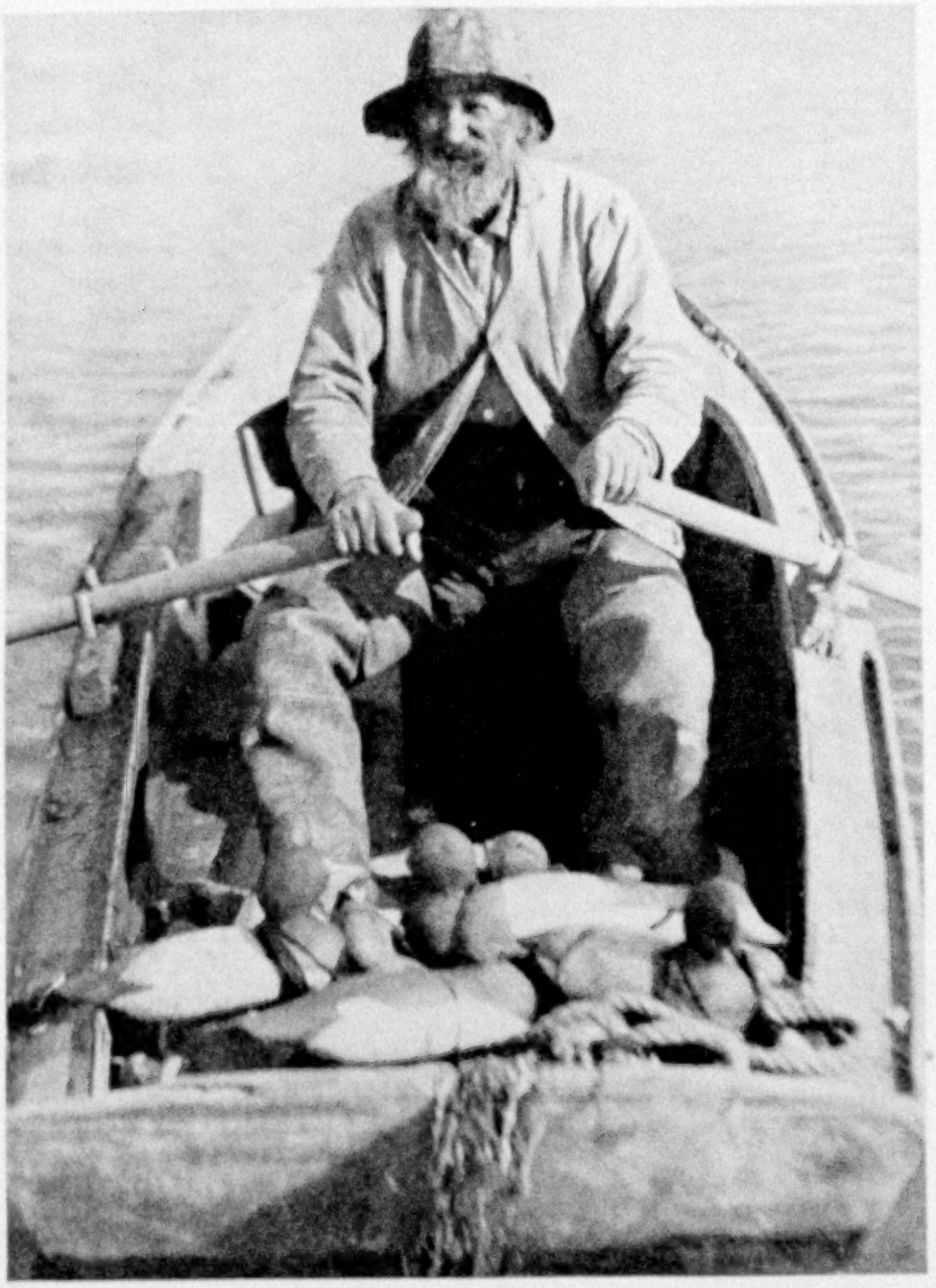
La Grange was built by Dr. James Craik, Rose Hill by Dr. Gustavus Brown. One would like Dr. Brown for his house; one would like him even more for his extensive and imaginative planting of his box-bordered rose gardens; but his irresistible challenge to our admiration is this extraordinary, candid, and generous letter which he wrote to Dr. Craik soon after returning from Washington's deathbed:

"I have lately met Dr. Dick again, in consultation, and the high opinion I formed of him when we were in conference at Mount Vernon last month, concerning the situation of our illustrious friend, has been confirmed.

"You remember how, by his clear reasoning and evident knowledge of the causes of certain symptoms, after the examination of the General, he assured us that it was not really quinsy, which we supposed it to be, but a violent inflammation of the membranes of the throat, which it had almost closed, and which, if not immediately arrested, would result in death.

"You must remember he was averse to bleeding the General, and I have often thought that if we had acted according to his suggestion when he said, 'He needs all his strength—bleeding will diminish it,' and taken no more blood from him, our good friend might have been alive now. But we were governed by the best light we had; we thought we were right, so we were justified."

Habre de Venture—a little hard to spell and to pronounce, but not easy to forget—was the home of Thomas Stone, a signer of the Declaration of Independence for Maryland. Although enriched by some good interior paneling, it is a modest house. Its other conventional features are surpris-



Photograph by H. Armstrong Roberts

A VETERAN OF THE POTOMAC DUCK BLINDS

He rows out to place his decoys, which he anchors against the drift of the stream by means of a short string and lead weight. The broad mouth of the deep bay called Wicomico River is known to many sportsmen as one of the best duck-hunting reaches on the Potomac, famous for its canvasback, redhead, and mallard (see, also, text, page 385).

ingly relieved by the fact that its ground line is actually bent, for it is built on the arc of a circle!

An amusing house, with an amusing name, is old Habre de Venture; but I have found that there are no end of funny place names surviving from colonial Maryland. To recall only a few, there are: Hard Bargain, Bachelor's Hope, Internment (with Resurrection Manor hard by, on the Patuxent), Governor's Gust, Clear Doute, Heart's Desire, New Bottle, Damfrit (with no key to whether the name referred to what the owner gave for it or cared for it), No Design, Come By Chance, Bread and Cheese Hall, and Want Water.

Returning to the broad sweep of the great river, the tide takes us westward past 15 miles of Virginia shore long known as Chotank. Two hundred years ago it was the domain of the single family of Fitzhugh. One of their estates here, Bedford, embraced more than 45,000 acres along the river. One of their surviving mansions, Marmion, yielded its paneled and painted drawing room to the collection of the celebrated early American interiors in the Metropolitan Museum, New York City.

FRANTIC COURTSHIP

Eagle's Nest was built by William Fitzhugh, who accompanied the other Potomac boys into that West Indian campaign under Admiral Vernon, but I found him more interesting for his original method of winning a wife. He fell in love with the young widow Rousby, who lived over on Patuxent, whither he used to go to court her.

She seemed not to have been sufficiently yielding to his impatient nature. One day he was taking leave of her at her landing when the nurse appeared with her baby. Fitzhugh was desperate enough to take a desperate measure. He is reported to have seized the child, jumped into his boat, put off some distance, and then held the child over the water with the threat to the

Photograph by Edwin L. Wisherd

HAULING IN THE CROP AT PORT TOBACCO, MARYLAND

One of the surviving phases of 17th-century life along the banks of the Potomac is that tobacco, which once was currency and which paid all the bills, is still a staple crop and continues to pay a goodly percentage of the bills (see, also, text, page 375).

young mother ashore that if she did not at once consent to marry him he would drop the child into the water to drown before her eyes.

Her reply is not preserved. It is sufficiently satisfactory, however, to know that she did become Mrs. Fitzhugh, and the baby lived to become Mrs. George Plater, wife of the sixth State Governor of Maryland.

As the river turns north it seems for some miles to lose touch with its own past. The smoke and roar on the Virginia shore indicate that here the railway touches the Potomac at several points. It is the railway between Richmond and Washington. But it is much more, for it is the road over which every traveler passes on his way between the North and the South Atlantic States—the roadway of all that vast winter traffic from Boston and New York and Philadelphia and their neighborhoods on its way to Florida.

On this line, at one of its meetings with the waterside, is the military city of Quantico, the principal barracks of the United States Marine Corps. On the Maryland side, not far above, we see the tall, smoking chimneys of Indian Head, where the Navy has a powder factory.

SHIP BELLS TOLL WHEN PASSING MOUNT VERNON

As we sweep up, past these evidences of a somewhat prosaic present, the romantic past of the river comes to the surface again, and it is quiet and peaceful and remote, as in the early days. A turn to the left and a bend to the right bring us into a long reach, framed in high green hillsides, where the greatest glory of the river comes into view. Every ship tolls its bell as it passes the white mansion with the eight slender columns, surrounded by its village of minor domestic buildings, high on the Virginia bank, for it is the home and last resting place of George Washington, his and our Mount Vernon.

During Washington's lifetime Mount Vernon was the focus of the hopes and plans for the independence of the Colonies, as well as of the historic characters who

Photograph courtesy U. S. Bureau of Fisheries

TO COLONIALS, AS TO MODERNS, THE NAME OF POTOMAC SHAD IS ONE TO CONJURE WITH

There is no fish roe so delicious as that of the shad, and a planked shad garnished with roe and bacon is as much a gustatory delight in the Nation's capital to-day as it was almost two centuries ago, when the beloved master of Mount Vernon and the owner of Marshall Hall were friends. These fishermen are taking shad from a commercial seine at Bryan Point, Maryland. The United States Bureau of Fisheries formerly had a station here for the propagation of shad and yellow perch, but two years ago it was moved across the river to Fort Humphreys.

clustered about Washington in their work of liberating them and making them into a nation.

In the 131 years since his death, not a foreigner of any distinction has come to America who has not come to this spot to pay his homage to the great character and the lofty ideals it represents. I would not venture to say how many Americans have visited Mount Vernon during this same time, but the number has increased year by year, until now Washington's home and tomb are visited annually by nearly 500,000 pilgrims.

Both shores of the Potomac and of its creeks in Mount Vernon neighborhood are rich in association with Washington and other celebrated men. Near by is Pohick Church, of which the General was a vestryman and which the Mount Vernon family and guests attended, their number making something of a Sunday morning cavalcade, with the great coach and four, a chaise or two, and a sprinkling of young people mounted on riding horses.

A BIT OF WASHINGTON REPARTEE

On the way to Pohick we pass Woodlawn, from its hilltop looking down Dogue Creek onto the blue river beyond. This estate was once a part of Mount Vernon's 8,800 acres; but Washington cut off 2,500 acres and gave them to his nephew, Lawrence Lewis, and his wife, Nellie Custis, and there they built Woodlawn Mansion, after the plans drawn for them by Dr. William Thornton, the architect of the Capitol of the United States and of other buildings in the Capital City.

Thornton was a wag as well as an artist. He told, and it seems to have remained unrepeated for 125 years, an anecdote which reveals, as does no other, how ready Washington could be at repartee. The General, it seems, was seated with other gentlemen at a hunt supper. His chair was directly before the fireplace, in which was a roaring fire. He politely endured the heat until supper had been dispatched and the port and pipes were put on the table. Then he explained his situation and rose to change his location.

"Why," spoke up one of the gentlemen, "it doesn't behoove a general to retire under fire."

"No," replied Washington, "and it doesn't become him to take fire from behind."

Looking down to the river from Woodlawn, the vast stretches of land on the left of the creek were all a part of Mount Vernon, and the high lands on the right of the creek were Belvoir, the domain of Lord Fairfax, under whose patronage young George Washington learned to be a surveyor.

Belvoir occupied a long peninsula between Dogue Creek and Gunston Cove, containing about 3,600 acres; yet, nearly surrounded by water as it was, the fence line it required, along its northwestern border, was only a mile long. The tract is now owned by the Government and is the Army Engineers' Fort Humphreys.

On the other side of Gunston Cove from Belvoir is Gunston Hall, built by George Mason. Here was a singular and able man, self-educated, the friend and adviser of Washington, Jefferson, and other contemporaries, and himself the author of the Fairfax Resolves, of the Virginia Bill of Rights, and of the Constitution of the State of Virginia.

NEIGHBOR DIGGES MADE MAJOR L'ENFANT AT HOME

Other places built by George Mason's sons and their families sprinkle the banks of this end of the Potomac, even as far as Analostan Island, below Georgetown.

Opposite Mount Vernon, on Piscataway Creek, where Calvert met the Indian emperor (see text, page 374), once stood Warburton Manor, since transformed into Fort Washington. Here lived Washington's friends and neighbors, the Digges, a family scarcely more at home on the Potomac than in London, where Thomas Atwood Digges sat for a portrait attributed to Sir Joshua Reynolds.

Neighbor Digges made at home, here at Warburton, a young French engineer, Maj. Pierre Charles L'Enfant, at the time when that young gentleman was actively engaged in drawing the since-realized plans for Washington.

Nine miles above Mount Vernon one's interest is arrested by Alexandria, for it and Georgetown, now a part of the Capital City, are two of the most interesting surviving settlements on Tidewater Potomac. Both are storied old neighborhoods,

Photograph by Fairchild Aërial Surveys, Inc.

THE MEMORIAL BRIDGE TO THE NATIONAL DEAD NEARS COMPLETION AT WASHINGTON

Between the Lincoln Memorial and the National Cemetery at Arlington, this magnificent structure, begun in 1926, will be formally opened in 1932, probably as a part of the George Washington Bicentennial Celebration. Beyond, and in a line with the Lincoln Memorial, are the shaft of the Washington Monument and the dome of the Capitol. In the background, at the extreme right, is the many-windowed Bureau of Printing and Engraving. The extensive buildings adjoining the Lincoln Memorial on the left are the temporary homes of the War and Navy Departments, while just across the street from them, and to the left, rises the white façade of the Pan-American Building.

rich in American history and in specimens of good early American architecture.

A little way down the river we left Mount Vernon, with all the actualities that remain of Washington the man. Ahead rises the panorama of the Capital City of our Nation, representing the actuality of Washington's ideals and hopes. Above its green skyline rise the lofty cornice of the Lincoln Memorial, the Parthenon of the Western World, and the white dome of the Capitol, where focus the lawmaking national Congress and the law-sustaining Supreme Court. Between the two, its tip touching the blue high above every other detail of its environment, is the Monument dedicated to the memory of Washington himself and a fitting apotheosis of the greatest of the great sons of Tidewater Potomac.

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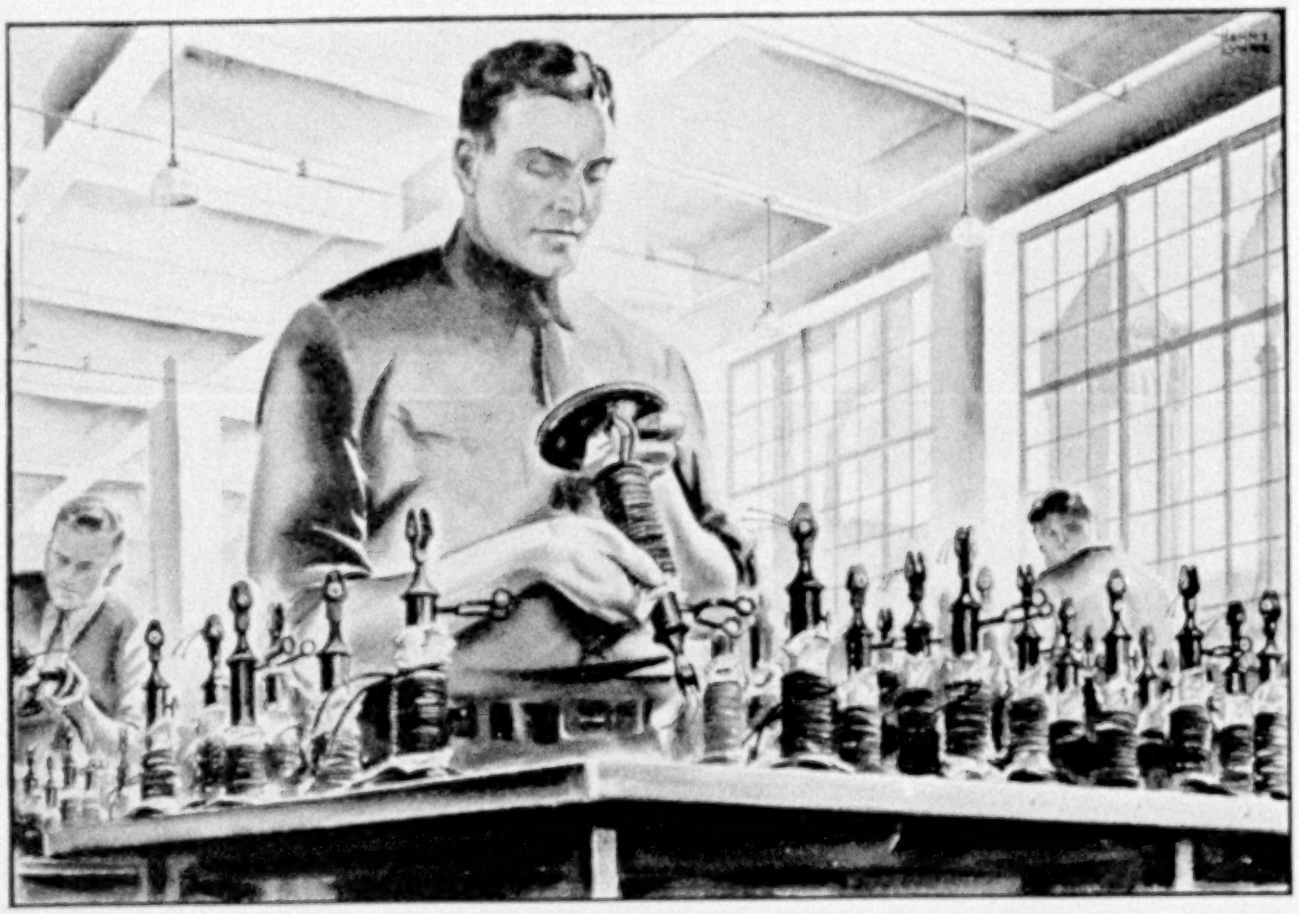

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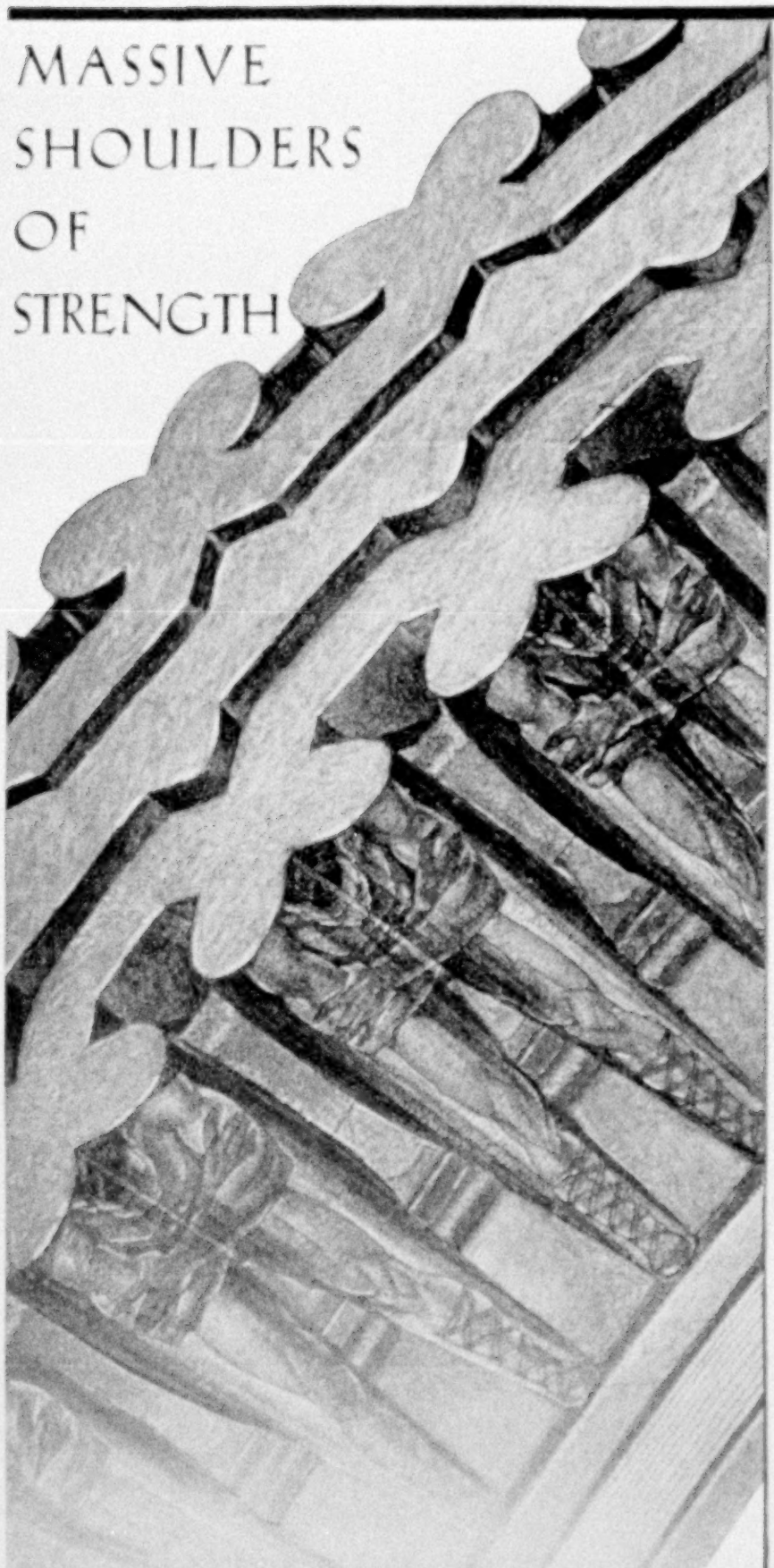
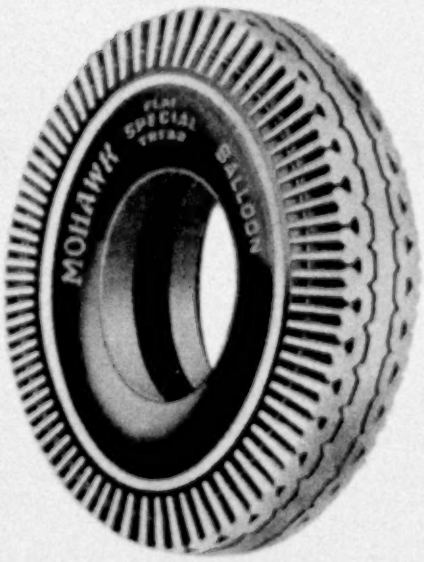


IN one important construction feature, the Mohawk Flat Tread Special Balloon differs radically from every other tire. The Tread is buttressed at the shoulders with long, powerful, pillar-like supports which taper up into the pliant, shock-absorbing balloon sidewalls.

These powerful shoulders distribute flexing — they prevent sharp hinge-like tread action which generates heat—rubber's greatest enemy—and this promotes long life and slow, even tread wear.

Look for the buttressed shoulders—the distinguishing marks of a distinguished tire.

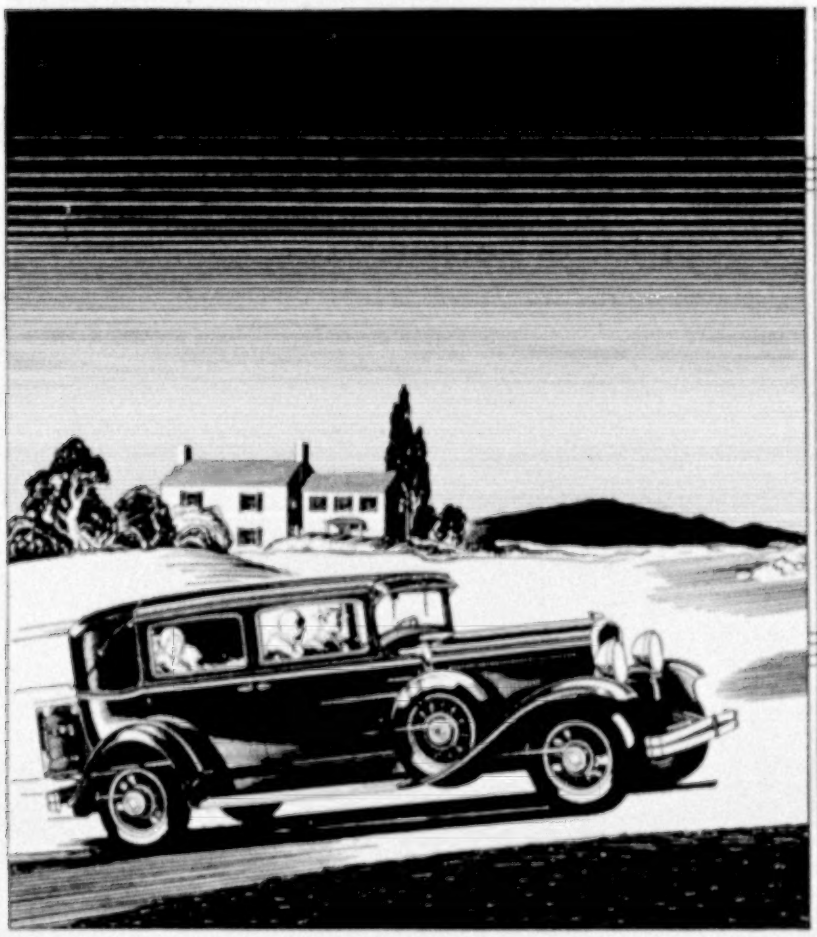
Featured by Quality Tire Dealers Everywhere



MOHAWKS GO Farther!

THE MOHAWK RUBBER COMPANY . . . AKRON, OHIO

For Seventeen Years Makers of Fine Tires



NEW CHRYSLER "77" TOWN SEDAN, $1795 (Special Equipment Extra)

© 1929 Chrysler Corporation

Today, as always, what Chrysler does—or proposes to do—becomes the basic standard of efficiency in the realm of automobiles

CHRYSLER INSPIRES a pride all its own

Ownership of a Chrysler brings with it a deep-rooted satisfaction which springs from the firm conviction that, regardless of price, Chrysler is a car that knows no peer.

Up to six years ago, thousands of motorists could be satisfied only with highest-priced motor cars.

Today they are driving Chryslers . . . and with polite boastfulness, for they have been able to find more complete fulfilment of their motoring ideals in a Chrysler than in any other car.

At the same time, because of surprisingly low prices, Chrysler has enabled thousands upon thousands to enjoy this fine motoring.

And because Chrysler gives the best performance motoring affords, Chrysler ownership imparts a certain thrilling pride, the like of which cannot be claimed so universally by any other motor car.

FEATURES: LARGE, POWERFUL ENGINES . . . SEVEN-BEARING COUNTER-WEIGHTED CRANKSHAFT . . . MULTI-RANGE FOUR-SPEED TRANSMISSION AND GEAR SHIFT . . . RUBBER SPRING SHACKLES . . . CHRYSLER WEATHERPROOF FOUR-WHEEL HYDRAULIC BRAKES . . . ROOMIER BODIES OF DREADNOUGHT CONSTRUCTION . . . ADJUSTABLE FRONT SEATS . . . METALWARE BY CARTIER ET CIE.

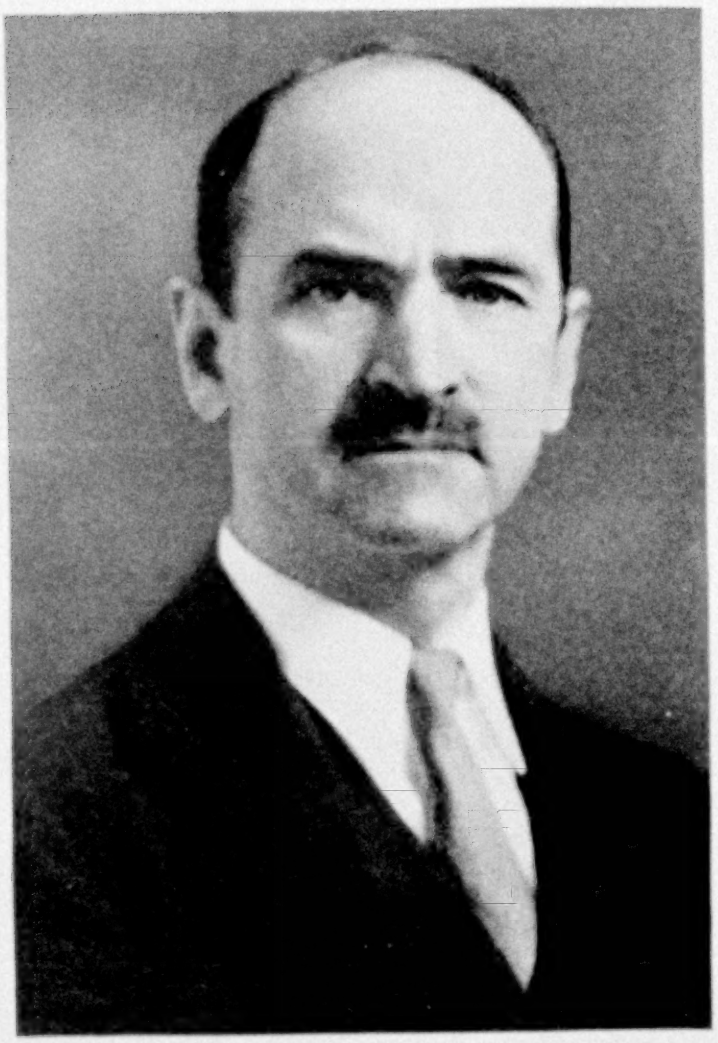
. . .

Chrysler Imperial, "77", "70" and "66" offered in all popular body styles—Prices range from $995 to $3575. All prices f. o. b. Detroit (Special equipment extra).

MULTI-RANGE

CHRYSLER

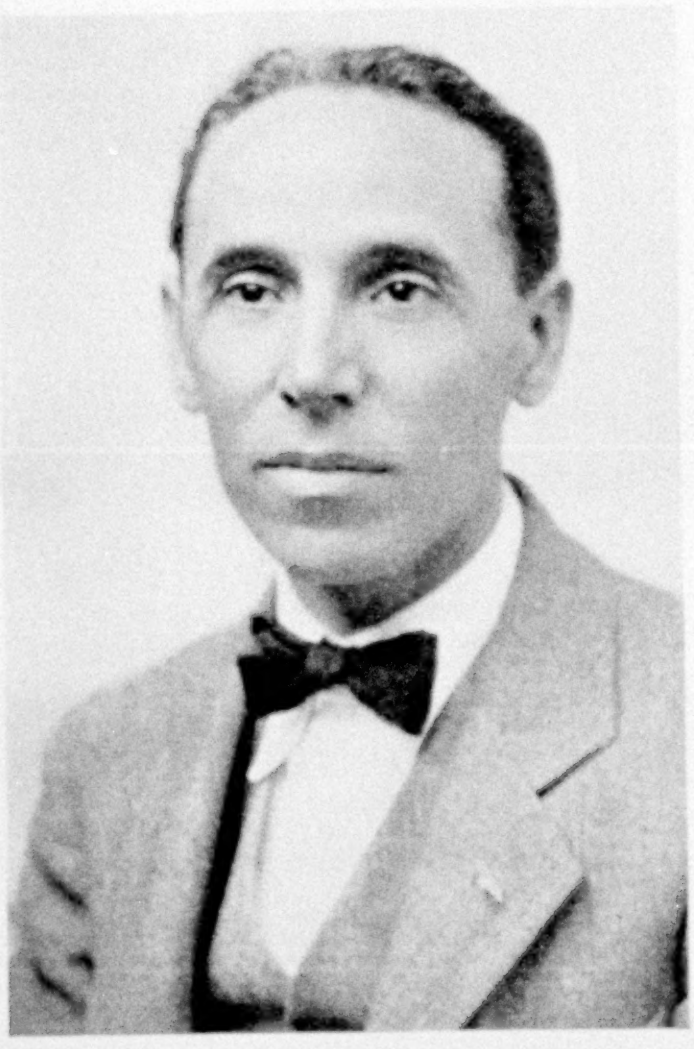
· PIONEER



· CURTISS

GLENN H. CURTISS, pioneer of the air, believes that the quality of sleep becomes increasingly important with the mounting tempo of our lives. "We are living longer—living faster—living more—and comfortable slumber seems more important than ever before," he says.

· DESIGNER



· BELLANCA

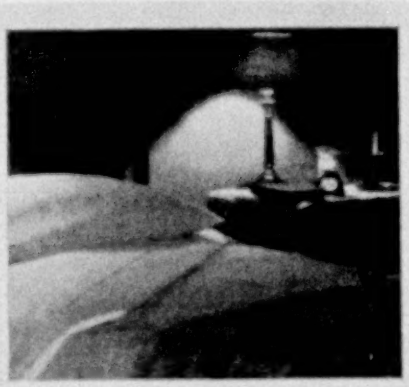
GUISEPPE BELLANCA, famous designer to whose tireless work in behalf of aviation is attributed the popularity of the American single-motor cabin plane, says, "Practically all citizens of the future will be aviators. Sleep is the source of the renewed energy which we will need."

Leaders in Aviation

Simmons Beautyrest Mattress, $39.50; Ace Box Spring, $42.50; Ace Open Coil Spring, $19.75. The new Deepsleep Mattress, $19.95. Deepsleep Box Spring, $27.50; Slumber King Spring, $12.00; Beds, $10.00 to $60.00.

SIMMONS

BEDS · SPRINGS
MATTRESSES AND
BERKEY & GAY
FURNITURE



MEN of daring accomplishment. Men of far vision—and keen judgment. Men of large affairs—and large hearts. Men who hold the admiration of the whole world for their achievements of great import to the world!

Tireless workers, every one of them. Yet every one absolute master of his energies.

How do they keep fit for the constant demand on them, the frequent call for a sudden rise to endurance far beyond that of the ordinary man?

Read above the simple words in which each tells the part that sound sleep plays

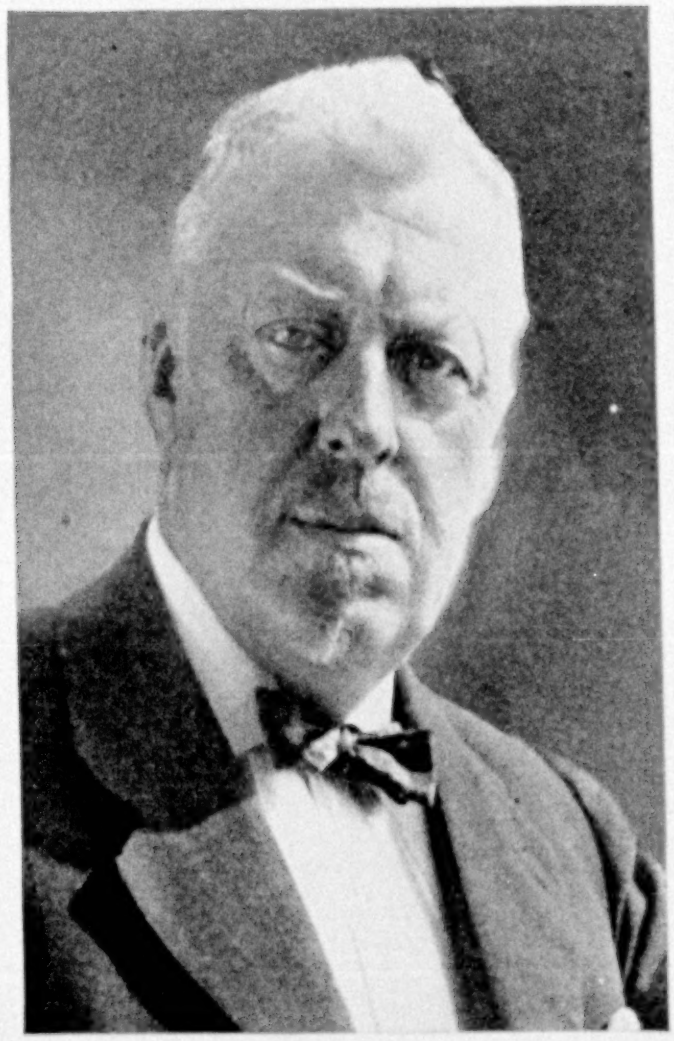
Copyright 1930, The Simmons Company

· EXPLORER

· BYRD

ADMIRAL BYRD, whose steadfast courage and cool physical endurance in his recent South Polar explorations have held the attention of the whole world, says that "proper sleep and exercise in the weeks preceding a long flight" help him to stand the terrible strain of it.

· NAVIGATOR



· ECKENER

DR. HUGO ECKENER, Commander of the Graf Zeppelin on its historic flight around the world, is a firm believer that sound sleep is what we need to keep us at the height of our capacity. "A person can be in full possession of his mental powers only if he gets excellent sleep," he says.

say: "SOUND SLEEP IS VITAL TO SOUND NERVES"

in keeping him fit. What these men say about the importance of sound sleep to the human machinery is significant for every one of us.

They speak not only for themselves. They say that these are days of strain and stress for all . . . that every man's and every woman's vital energy must be maintained at its highest level . . . that the basic source of such fitness is the full nightly quota of truly restorative sleep.

Succinctly, "Sound sleep is vital to sound nerves." The Simmons Company, New York, Chicago, Atlanta, San Francisco.

The latest Heisey design (No. 1401). A complete table service in crystal, Flamingo rose, Moon Gleam green or Sahara gold. Also ask to see Heisey's new Alexandrite.

Crystal that good taste chooses

LOVELY sparkle of crystal on your table . . . gleaming crystal! Don't you just adore it and doesn't it make entertaining ever so delightful? ' ' ' Since the momentous nineties, when hostesses have wanted fine crystal they have turned to Heisey's as the choice of good taste. Because for so many years now the name Heisey has been assurance of superb quality in glassware. ' ' ' The whys and wherefores of this are to be seen in the never-flagging devotion of Heisey craftsmen to artistic achievement and originality of design. They have had much to do with making glassware the vogue. Their exquisite creations in both crystal and colors are to be seen at leading stores. And the price is modest.

When buying for your own use or for friends, you will be glad to have the booklet, "Gifts of Glassware." Write for your copy.

A. H. HEISEY & CO., NEWARK, OHIO

Heisey's

GLASSWARE *for your table*

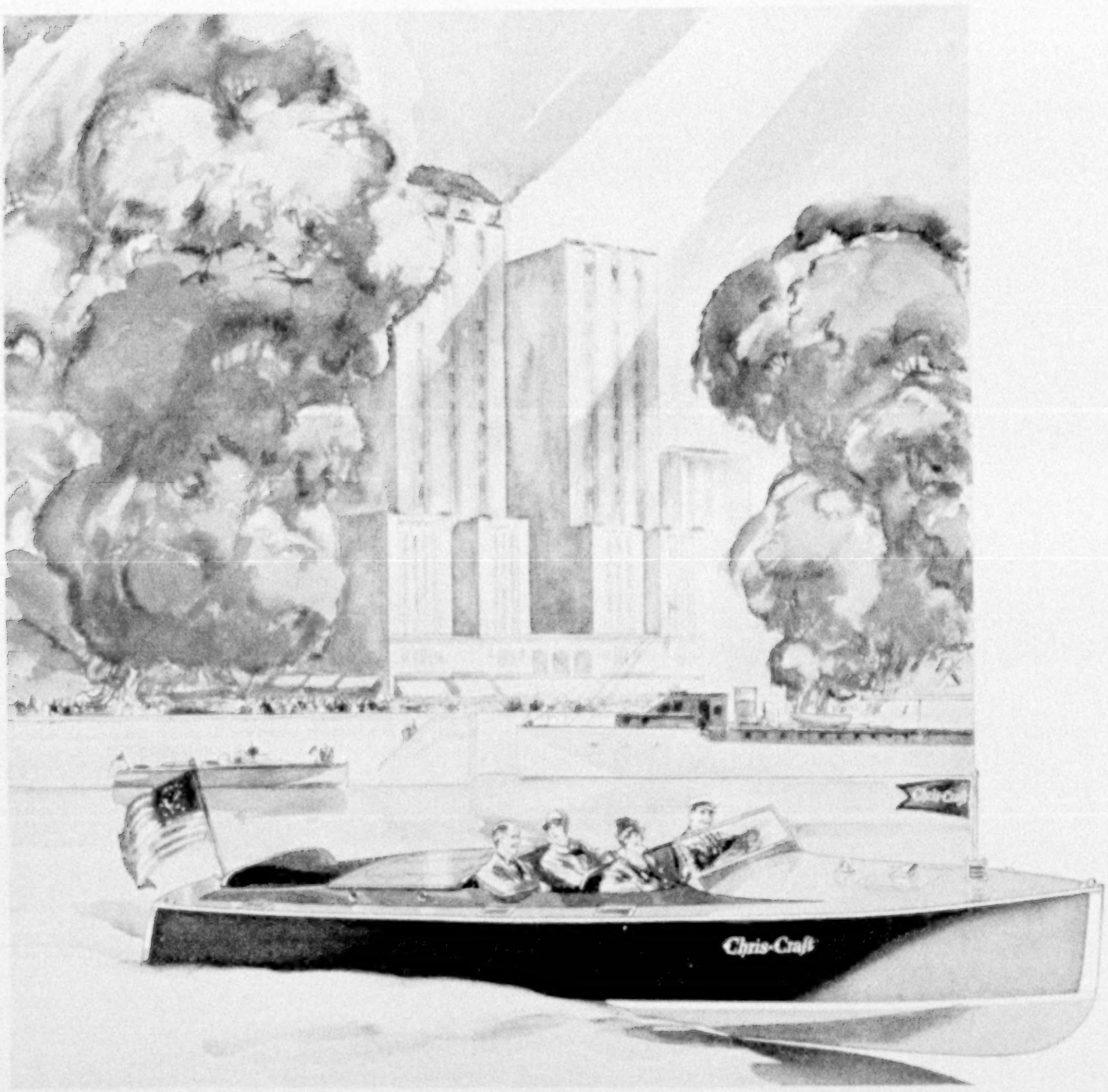
LOOK FOR THE

ON EVERY PIECE

embossed on the glass or on adhesive label

Glass Perfected Through the Secrets of 4000 Years

IN ANCIENT Constantinople, mighty seat of empire, skilled craftsmen worked in that section of the city known as the Gateway of Glass. Here during the flourishing period of art called the Byzantine, they developed wondrous secrets of coloring and making glass, so that their rich mosaics have ever since been famous. They also wrought beautiful lamps, vases, bowls and chalices, which are now treasured in museums. Modern American glassware by Heisey is the fruition of the secrets of ages.



The 20-foot all-mahogany Chris-Craft runabout is priced at $1895; the 22-foot runabout at $2195 and $2595.

A TREASURE chest of bountiful health lies open to the Chris-Craft owner. Life on the water offers a multitude of thrills and pleasures unknown on land ››› One may splash about at the swimming raft, take dinner at the distant yacht club, then swing past a dozen miles of shoreline to evening social affair in remarkably short time ››› Chris-Craft days are full of joy. Go fishing, step out and win a race, entertain guests in delightful comfort, or just loiter among wooded islands. A whole new range of pleasures begin at the water's edge and all are spread before the Chris-Crafter for his choice ››› Distinctive among the 24 models of the 1930 Chris-Craft fleet are the 20 and 22-foot runabouts. They are luxurious, deep-cushioned, 9 passenger Chris-Craft. They go like the wind, yet are easily controlled by boy or girl. They start, stop, steer, turn and reverse like an automobile, yet they are infinitely more flexible ››› Priced at $1895, the 20-foot Chris-Craft runabout is the lowest priced Chris-Craft ever offered. The 22-foot Chris-Craft is listed at $2195 and $2595, offering a life-time of dependable water transportation ››› Illustrated catalog may be had by writing Chris Smith & Sons Boat Co., 763 Detroit Road, Algonac, Michigan.

Chris-Craft

World's Largest Builders of All-Mahogany Motor Boats

Runabouts—Sedans—Commuters—Cruisers—Yachts
24 Models — 20 to 48 feet — $1895 to $55,000

ABOVE: Red Mountain Pass on the Chief Ouray ("Million Dollar") Highway.
BELOW: Beaver Pond and View in Pingree Park and a Sugar Beet Field.

COLORFUL COLORADO

THE KEY STATE OF THE NEW WEST

One Hundred Thousand Square Miles . . Rapture in Every Foot of It.

The fact is that Colorado has everything you can reasonably want as a resident, as a vacationist, or as the experienced traveler who takes advantage of Colorado's accessibility* and comes often at all times of year to enjoy its varied charms.

Colorado holds a lifetime of thrilling things to see and pleasant things to do. It offers a background of genuine opportunity —a chance to grow up in a new country. Come as soon as you can, but send right away for the new 48-page Colorado book, full of remarkable pictures.

*Overnight from half the nation, two nights from almost anywhere.

THE COLORADO ASSOCIATION

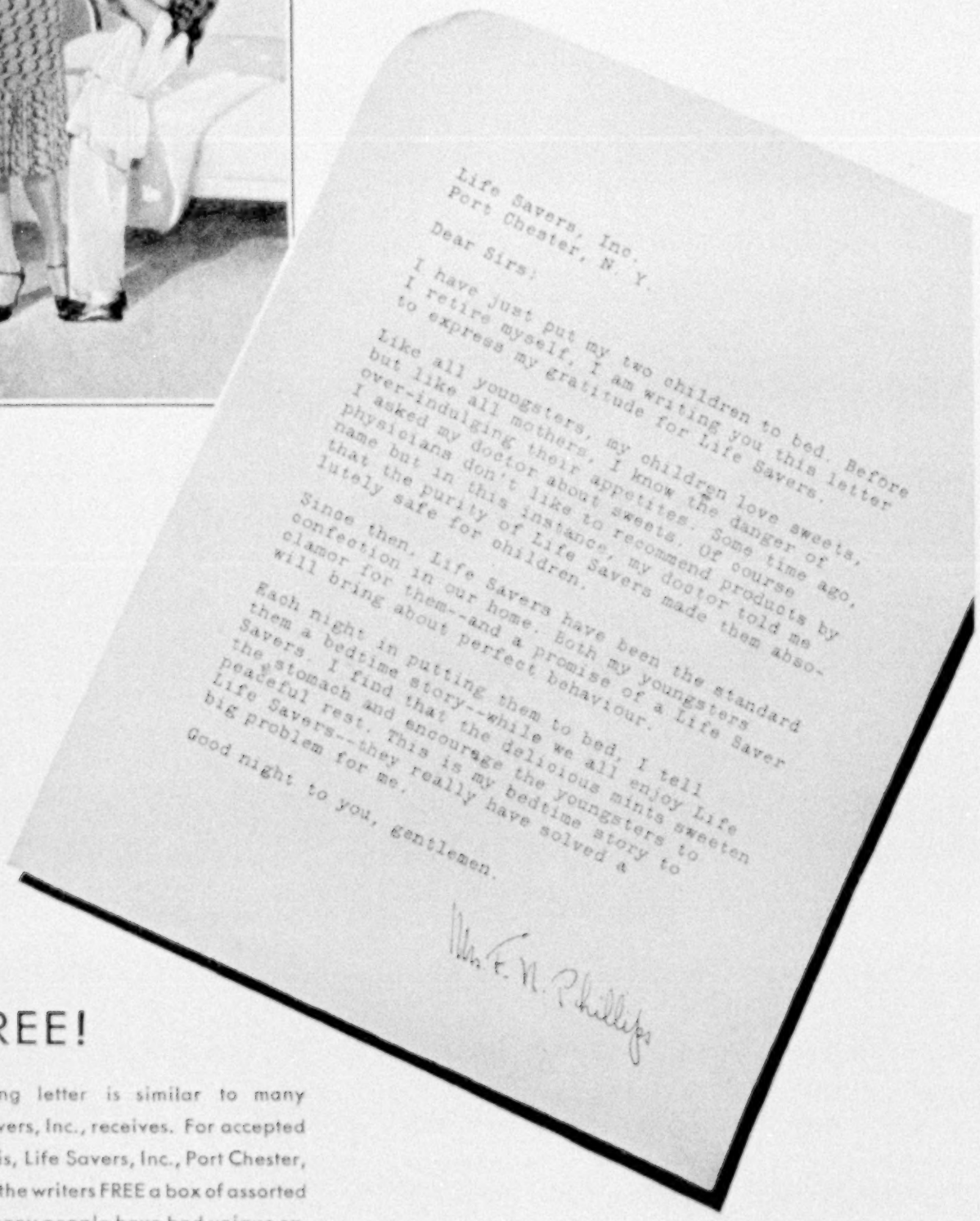
High-altitude sunshine gives Colorado melons, peaches, pears, apples their very special deliciousness. Watch for them.

THE COLORADO ASSOCIATION, 820 Kit Carson Bldg., Denver, Colo.

Send "Colorful Colorado: Opportunity's Playground."
Include specific information about .....

Address .....

A MOTHER DISCOVERS A NEW BEDTIME STORY*



Life Savers, Inc.,
Port Chester, N. Y.

Dear Sirs:

I have just put my two children to bed. Before I retire myself, I am writing you this letter to express my gratitude for Life Savers.

Like all youngsters, my children love sweets, but like all mothers, I know the danger of over-indulging their appetites. Some time ago, I asked my doctor about sweets. Of course physicians don't like to recommend products by name but in this instance, my doctor told me that the purity of Life Savers made them absolutely safe for children.

Since then, Life Savers have been the standard confection in our home. Both my youngsters clamor for them--and a promise of a Life Saver will bring about perfect behaviour.

Each night in putting them to bed, I tell them a bedtime story--while we all enjoy Life Savers. I find that the delicious mints sweeten the stomach and encourage the youngsters to peaceful rest. This is my bedtime story to Life Savers--they really have solved a big problem for me.

Good night to you, gentlemen.

Wm. F. N. Phillips

*FREE!

THIS interesting letter is similar to many which Life Savers, Inc., receives. For accepted letters such as this, Life Savers, Inc., Port Chester, N.Y., will send to the writers FREE a box of assorted Life Savers. So many people have had unique experiences with Life Savers that we are very interested to know about them. What have you discovered about Life Savers? When do you and your children enjoy them most? Don't you find that they help digestion, sweeten the breath, soothe the throat and are very delightful after smoking?

Why not write us your letter today?

They Have Grown Up Together

Detroit in 1805 was already an active trading center

THE history of mutual insurance parallels the history of American business, from its beginnings. There are five mutual insurance companies over 125 years old; twenty-one over 100 years old.

When American business was largely barter—exchange of commodities—mutual insurance was protecting those engaged in it.

And today when American industry surpasses anything the world has ever known, mutual insurance companies are still protecting property, lives and risks to the extent of over 100 billion dollars.

For any casualty risk, corporations or individuals can find no stronger protection, no better service than that offered by outstanding, legal reserve mutual companies.

On the matter of cost, the mutual casualty policyholder pays no higher rates than those asked by other carriers. Further, he is a part owner of the business and shares in its welfare. Savings that accrue from careful and economical management are passed on to him in annual dividends.

Write today for an interesting booklet on mutual casualty insurance. It will be of value to anyone engaged in business. No solicitation of any kind will follow. Address Mutual Casualty Insurance, Room 2200, 180 North Michigan Avenue, Chicago, Illinois.

MUTUAL PROTECTION IS AVAILABLE FOR THESE CASUALTY RISKS:

Workmen's Compensation	*Fidelity*
Accident and Health	*Property Damage*
Automobile (all forms)	*Plate Glass*
Burglary and Theft	*Liability (all forms)*

MUTUAL CASUALTY INSURANCE

These Old Line Legal Reserve Companies Are Members of

NATIONAL ASSOCIATION OF MUTUAL CASUALTY COMPANIES *and* AMERICAN MUTUAL ALLIANCE

Allied Mutuals Liability Insurance Co., *New York City;* American Mutual Liability Insurance Co., *Boston, Mass.;* Builders Mutual Casualty Co., *Madison, Wis.;* Central Mutual Casualty Co., *Kansas City, Mo.;* Employers Mutual Casualty Co., *Des Moines, Ia.;* Employers Mutual Liability Insurance Co., *Wausau, Wis.;* Exchange Mutual Indemnity Insurance Co., *Buffalo, N. Y.;* Federal Mutual Liability Insurance Co., *Boston, Mass.;* Hardware Mutual Casualty Co., *Stevens Point, Wis.;* Interboro Mutual Indemnity Insurance Co., *New York City;* Jamestown Mutual Insurance Co., *Jamestown, N. Y.;* Liberty Mutual Insurance Co., *Boston, Mass.;* Lumbermens Mutual Casualty Co., *Chicago, Ill.;* (American) Lumbermens Mutual Casualty Co. of Illinois, *New York City;* Merchants Mutual Casualty Co., *Buffalo, N. Y.;* Michigan Mutual Liability Co., *Detroit, Mich.;* Mutual Casualty Insurance Co., *New York City;* Texas Employers Insurance Association, *Dallas, Tex.;* U. S. Mutual Liability Insurance Co., *Quincy, Mass.;* Utica Mutual Insurance Co., *Utica, N. Y.*

How lovely teeth are best protected

against destructive, germ-laden film

FREE . . . *a 10-day tube of Pepsodent to try*

CERTAIN germs are present in tooth decay. Other types in pyorrhea; other kinds in trench mouth. Authorities believe 8 dental troubles out of 10 are caused by bacterial infection.

Germs are covered and imprisoned by a dingy, clinging coating on the teeth and gums called film. There they breed by millions in contact with the teeth.

Germ-laden film fills every tiny crevice in enamel. It clings so tightly that you may brush until you harm the teeth and gums without dislodging it effectively. That is why all the ordinary methods fail in combating film effectively.

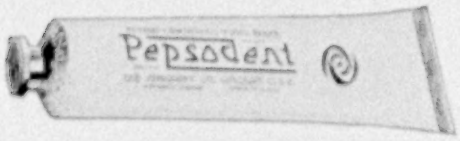
Remove film a different way

To reach and remove these germs, film must be combated. To remove film, dental authorities developed the different acting tooth paste, Pepsodent.

First, Pepsodent curdles film, then light brushing easily removes it . . . safely, gently. No pumice, harmful grit or crude abrasive, but a fine, creamy paste prescribed for soft teeth and tender gums.

You can tell that Pepsodent is different from all other ways the instant it touches your teeth. You can see the difference in results before your free tube is empty. Write to nearest address immediately for your supply to try.

Use Pepsodent twice a day. See your dentist at least twice a year.



AMOS 'n' ANDY

America's Premier Radio Feature

You will enjoy these inimitable blackface artists — the children will enjoy them too. Tune in every night except Sunday at:

7 p. m. on stations operating on Eastern time; 10:30 p. m. on stations operating on Central time; 9:30 p. m., Mountain time—8:30 p. m., Pacific time.

FREE 10-DAY TUBE

Mail coupon to

The Pepsodent Co.,
Dept. 193, 919 N. Michigan Ave.,
Chicago, Ill., U. S. A.

Name.....

Address.....

City.....

Other Offices: The Pepsodent Co.
191 George St. . . . Toronto 2, Ont. Can.
8 India St. . . . London, E. C. 3, Eng.
(Australia) Ltd., 72 Wentworth Ave. Sydney, N. S. W.

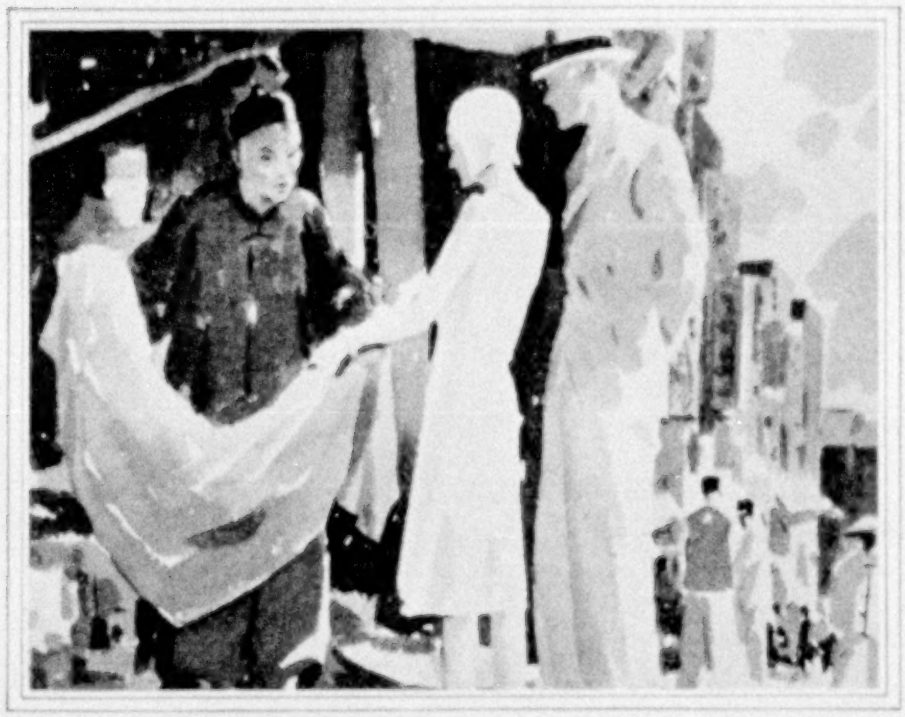
Only one tube to a family 3398

FIRST CLASS

ROUND THE WORLD

-as low as $1110.

Home Town to Home Town



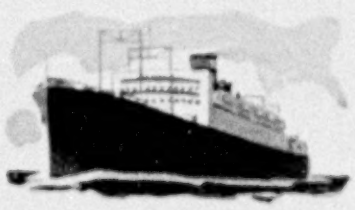
ON one of the famous President Liners, you enjoy all the freedom, all the luxury of a cruise on a private yacht.

Stop over where you please within the two-year limit of your ticket . . . visit Japan, China, the East Indies at your leisure, glimpse the fascinating, far-off corners of the world, and then—continue your travels on another President Liner as you would on another train.

And this acme of travel experience—with comfort, accommodations, service second to none—is yours for as little as $1110! Spacious cabins with real beds, delicious meals, and an unforgettable trip Round the World, in 85 days, or two years, as you like.

INFORMATION—SAILINGS

You may start from New York, Boston, Seattle, Victoria, B. C., Los Angeles or San Francisco. Every week a palatial President Liner sails from Los Angeles and San Francisco—via the Sunshine Belt—for Honolulu, Japan, China, Manila and thence fortnightly to Malaya—Java nearby—Ceylon, (India overnight by Pullman), Egypt, Italy, France, New York.



Every two weeks a President Liner sails from Boston and New York for Havana, Panama, California, thence Round the World.

Every fortnight a similar Liner sails from Seattle and Victoria, B. C., for Japan, China, Manila and Round the World.

All staterooms are amidships, outside, with real beds. De luxe Liners, luxurious public apartments, outdoor swimming pool, world-famed cuisine. First Class only, Round the World, as low as $1110, Home Town to Home Town; with private bath $1370.

COMPLETE INFORMATION FROM ANY STEAMSHIP OR TOURIST AGENT

DOLLAR STEAMSHIP LINES

AND

AMERICAN MAIL LINE

604 FIFTH AVE.	NEW YORK	201 BROADWAY	SAN DIEGO, CALIF.	517 GRANVILLE ST.,	VANCOUVER, B. C.
25 AND 32 BROADWAY	NEW YORK	210 SO. SIXTEENTH ST.	PHILADELPHIA	32 VIA VITTORIO VENETO	ROME, ITALY
110 SOUTH DEARBORN ST.	CHICAGO	DIME BANK BUILDING	DETROIT	11 BIS RUE SCRIBE	PARIS, FRANCE
UNION TRUST ARCADE	CLEVELAND	1005 CONNECTICUT N.W.,	WASH., D. C.	22 BILLITER STREET	E. C. 3, LONDON
177 STATE ST.	BOSTON, MASS.	152 BROADWAY	PORTLAND, OREGON	YOKOHAMA KOBE	SHANGHAI
514 W. SIXTH ST.,	LOS ANGELES, CALIF.	406 THIRTEENTH ST.,	OAKLAND, CALIF.	HONG KONG	MANILA
ROBERT DOLLAR BLDG.,	SAN FRANCISCO	909 GOVERNMENT ST.,	VICTORIA, B. C.	4TH AT UNIVERSITY	SEATTLE, WASH.

Play these California days

close to San Francisco
. . . and a glorious secret

Days in the Redwoods . . .
if you like to play at resting

CLOSE to San Francisco, with its world-known flair for living, California offers you a great vacation . . . Here are flashing days at high Lake Tahoe . . . in Yosemite . . . or down beside the waves that roll from China and beyond. Here is every kind of out-door sport. Here are days in the Redwoods, contemplative, quiet . . . if you'd rather play at resting. Here are debonair Del Monte and the like . . . and storied gold-spent towns of '49 for you to browse around in. Here each day can be as different as you care to make it, strenuous or simply lazy . . . underneath the everlasting sun.

Center of this great vacation-land and *America's coolest summer city,* San Francisco invites you to make this fascinating city your headquarters. *San Francisco!* With the secret of an art it calls its own—a gracious, joyous art of living. Where every phase of life—and opportunity—bring thousands to visit and back again to live!

The coupon below brings an interesting illustrated book. Start planning now.

Beginning May 15 low roundtrip excursion rates will be in effect to San Francisco and the Pacific Coast on all railroads. The Victory and Lincoln Highways will be in good condition. Or come by air, or by steamship via Panama Canal.

SAN FRANCISCO
IN CALIFORNIA—"WHERE LIFE IS BETTER"

CALIFORNIANS INC., Dept. 503, 703 Market Street, San Francisco: *Please send the free book "California Vacations".*

Name_____

Address_____

Out here white-foamed surf ceaselessly booms on whiter beaches. Out here the sun shines brighter, and a cool, salt breeze whispers a song of far places.

Sit in the sun and loaf and invite your soul. Plunge into the tangy sea and wrestle with tireless, laughing breakers . . .

Come and bring your bathing suit, along with your other sports togs . . . your golf kit, your riding clothes . . . for here's bathing like you've never known. And in this purer air there's nothing to absorb the needed ultra-violet rays of the sun . . . it's *undiluted*, health-giving sunshine!

The sea, if you prefer it . . . or some high, pine-fringed lake, where mountains with snowy heads gaze tolerantly down on you . . .

Glacier Park and Pacific Northwest, and the Columbia River Country—all reached by sumptuous Great Northern trains—the new *Empire Builder* and the luxurious *Oriental Limited*.

The New

EMPIRE BUILDER

The Luxurious

ORIENTAL LIMITED

Your local ticket agent will supply you with new illustrated literature, or you can write direct to Great Northern travel headquarters at Saint Paul.

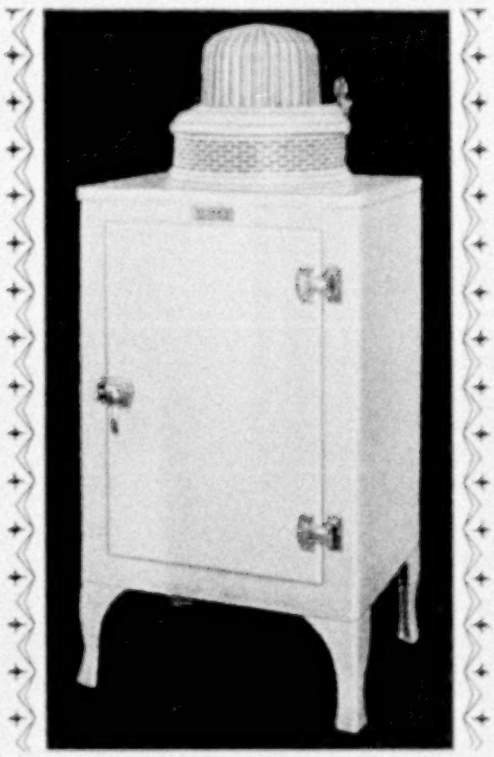
Get *all* the best electric refrigerator features *in this new*

WILLIAMS ICE-O-MATIC

Too many electric refrigerators have been sold on the appeal of some *one* mechanical feature. You are rightly entitled to *all the best features when investing your money.* This advanced new Williams Ice-O-Matic combines—for the very first time—the 15 most important characteristics of American and European makes.

Williams Ice-O-Matic is designed for the woman who is too busy to be bothered with mechanical details. It is amazingly simple, completely quiet, and virtually as inexpensive to operate as electric light.

This great household convenience literally pays for itself by the food it saves. In winter or summer, Ice-O-Matic protects your family's health by the safely low temperature in its roomy storage space. Ice-O-Matic preserves the flavor and goodness of all edibles—adds zest to every meal. Mail the coupon now for information and an interesting new recipe book.



WILLIAMS
ICE-O-MATIC
New
Capitol Model
$175
and up, at the factory
Convenient Payments

WILLIAMS OIL-O-MATIC HEATING CORP., BLOOMINGTON, ILL.

WILLIAMS
ICE-O-MATIC
REFRIGERATION

A RADIO TREAT—Tune your radio to WJZ and NBC chain stations at 7:30 o'clock Eastern Standard Time each Sunday night. Friday nights at 8:30 Central Standard Time tune in WGN, Chicago.

Williams Oil-O-Matic Heating Corporation NG-3-30
Bloomington, Illinois
Please send me—without cost—your Williams Ice-O-Matic recipe booklet.

Name .....

Street .....

City ..... *State* .....

To California!

Across horizons where rose the seven cities of Cibola

Was it only a prank of the western sun . . . the fleeting silhouette men thought they saw of cities of turquoise, pearl and gold? Was it only a prank *or was it prophecy* . . . that flashed to gold the cold steel helmets of Coronado's soldiers of Spain when they searched for the fabulous cities of Cibola . . .

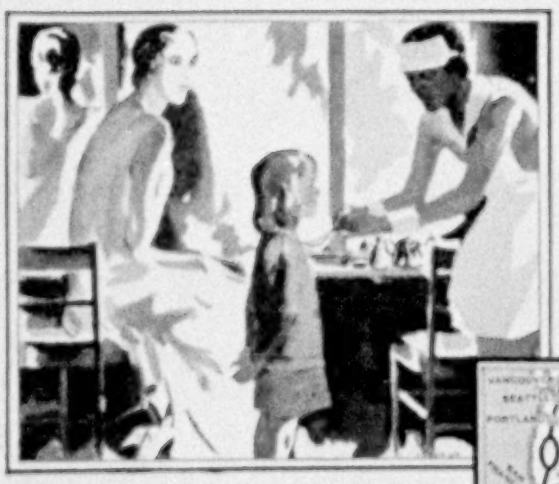
Today in this same western sun a new steel flashes in many a league of Coronado's path. Steel rails of Southern Pacific's SUNSET ROUTE.

And the cities that edge its glittering miles out-fable the cities the Spaniards sought. New Orleans, the SUNSET's source. Houston. San Antonio. El Paso. Tucson. Phoenix. San Diego. Los Angeles. San Francisco. These shine today in the bold reality of sky-thrust stone and steel and reclaimed desert that is become acre upon acre of agricultural wealth.

As your train speeds into the golden evening you can forget, if you like, the world that is new and the one that is gone . . . you need only a mind to good living. "Sunset Limited" is a kingly train . . . and yours to enjoy as you will—a diner the hospitable South has sponsored—club and observation cars with skilled attendants waiting for your wish.

Sunset Route is not Southern Pacific's only way to California nor is it the only one that lifts horizons. Overland Route, Golden State Route and Shasta Route have stories of their own to tell . . . and blue-blood trains for you to travel on.

To go West one route, return another is Southern Pacific's way of making the whole Pacific Coast and half the United States a part of one regular roundtrip ticket. A ticket that finds and interprets the West. For Southern Pacific rails follow natural pioneer pathways . . . It is close to the spirit of the West you are to see. Its vast network of lines explore the whole Pacific Coast. Southern Pacific is the only railroad offering choice of four routes. Go one way, return another. Stopover anywhere.



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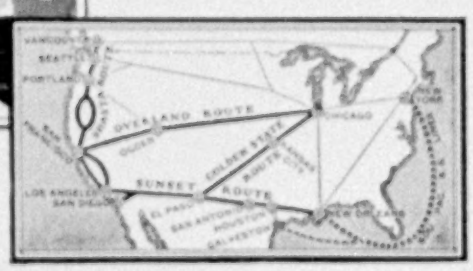

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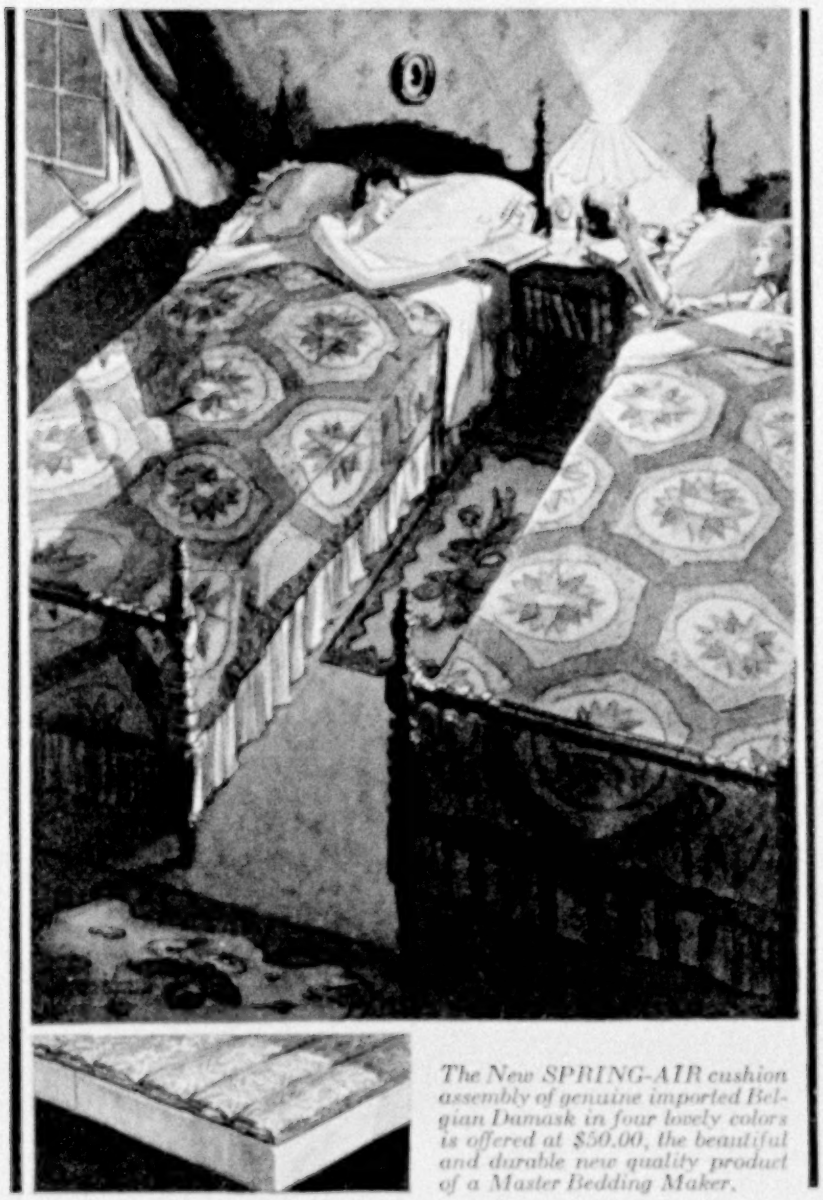

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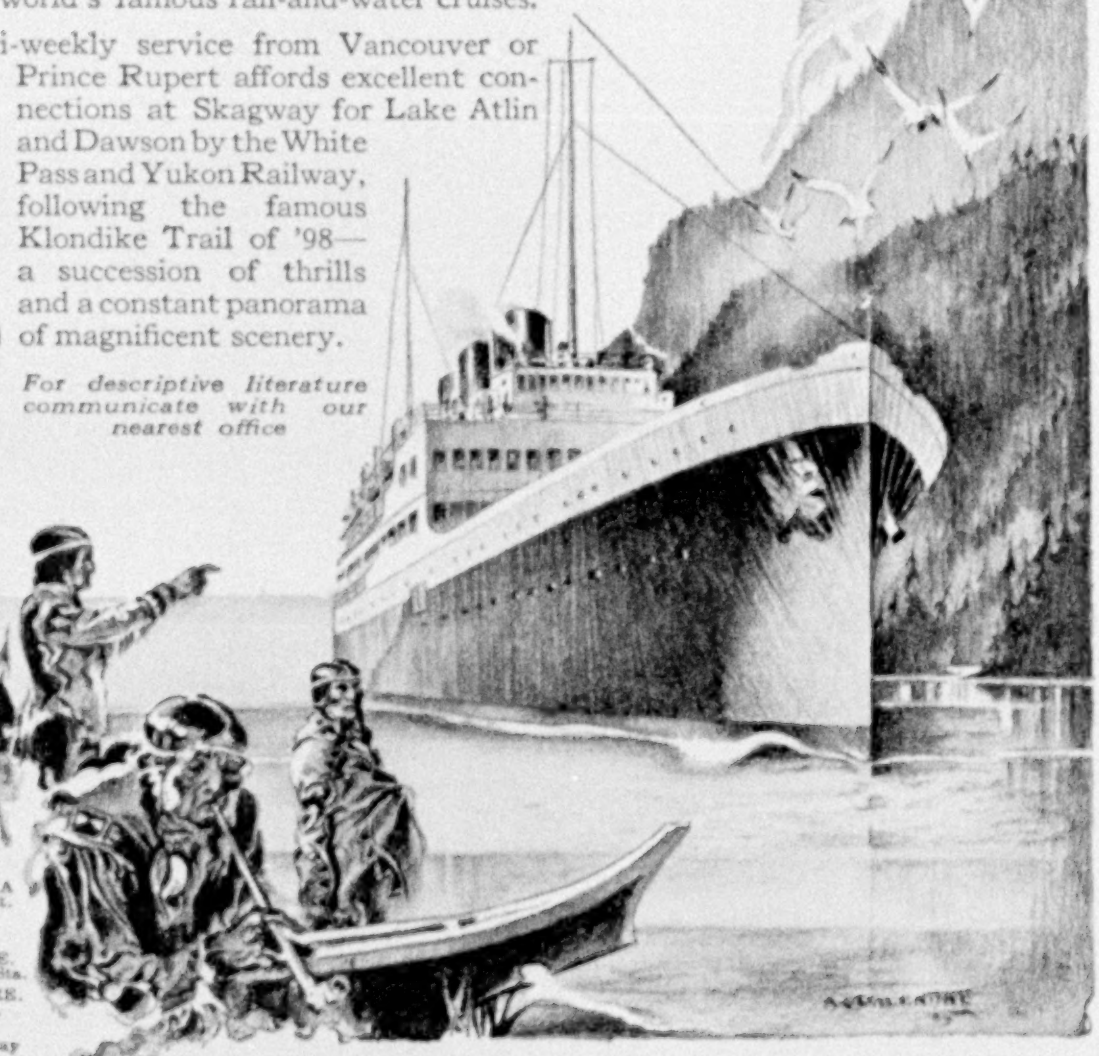

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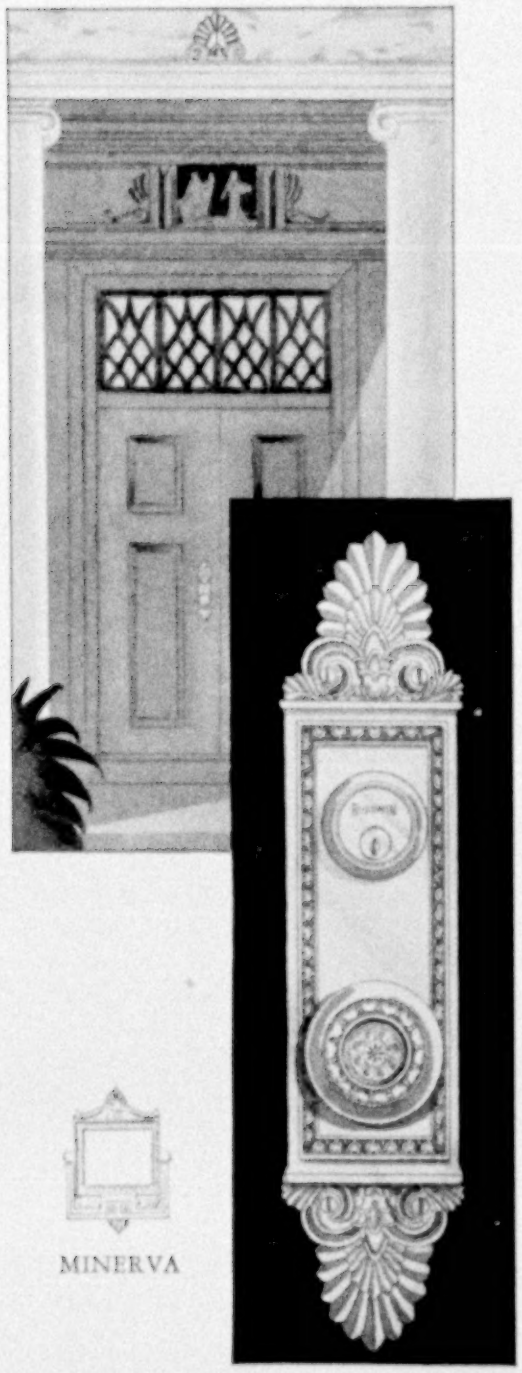

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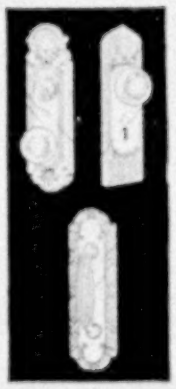

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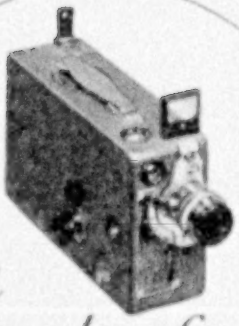

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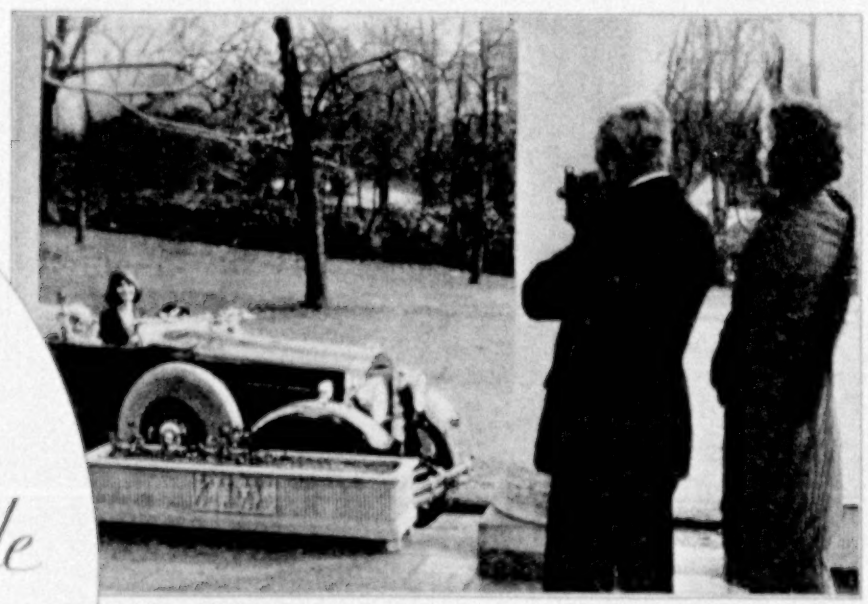

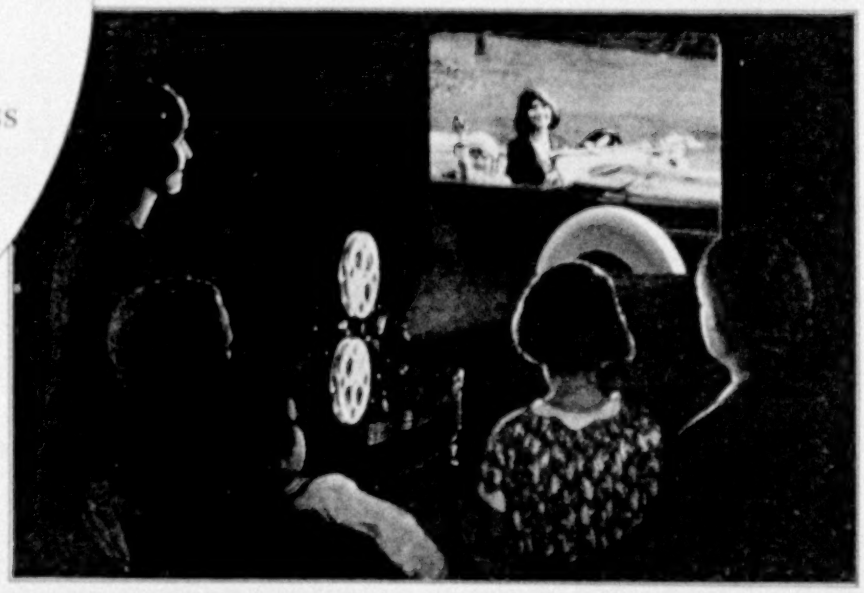

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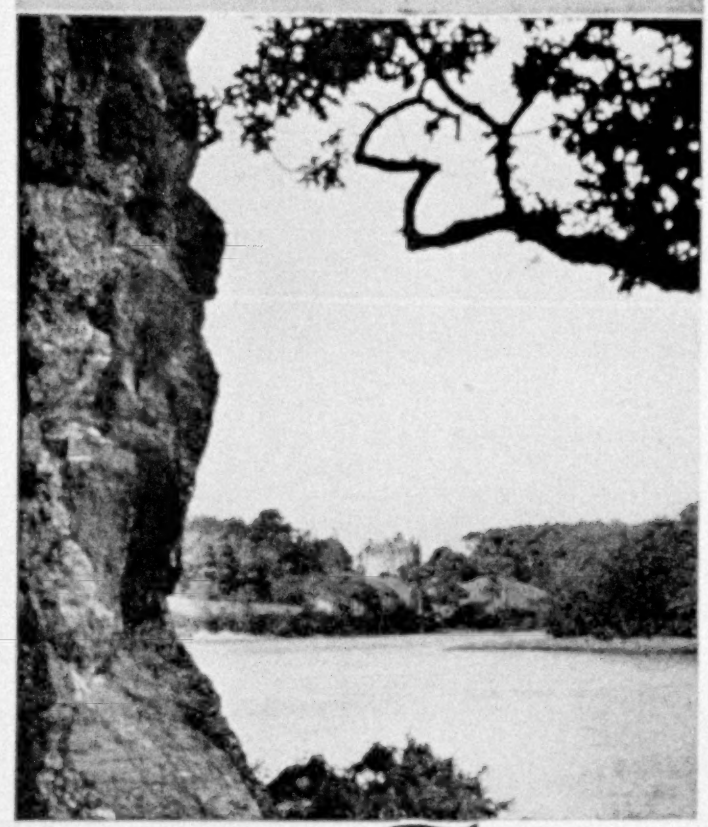

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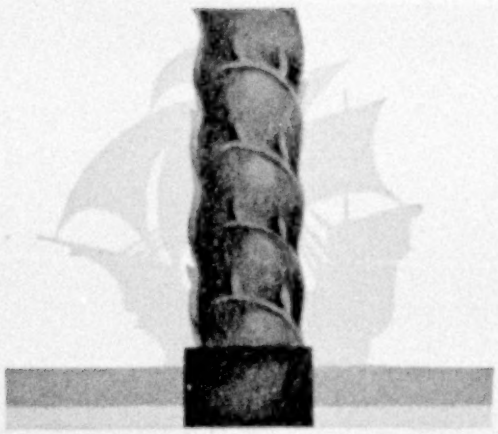

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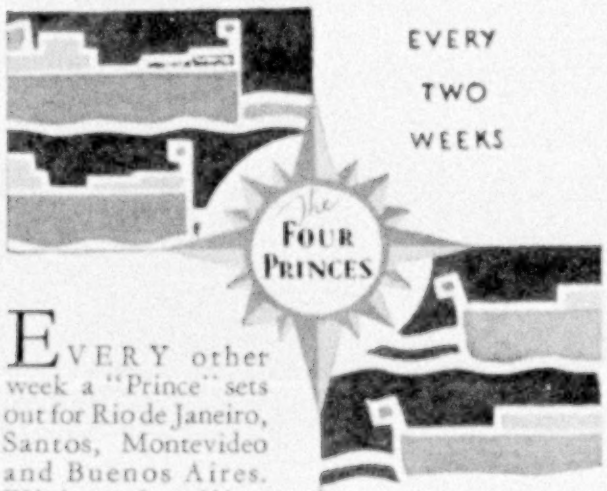

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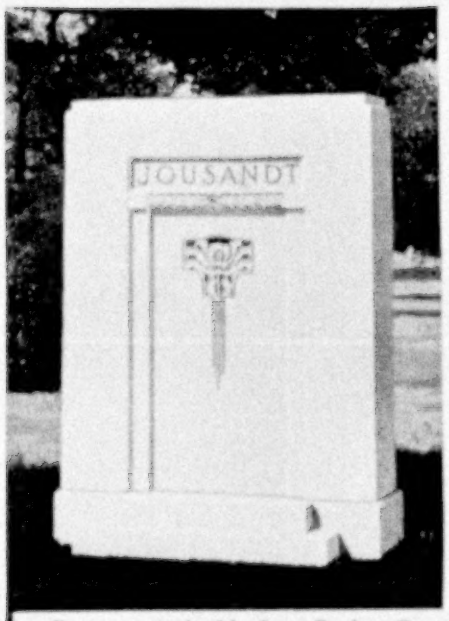

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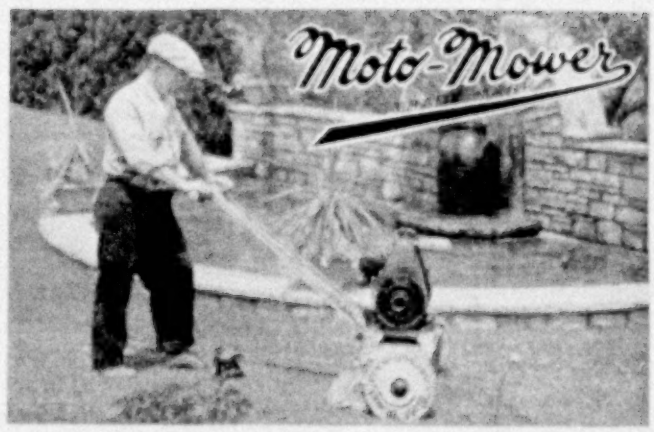

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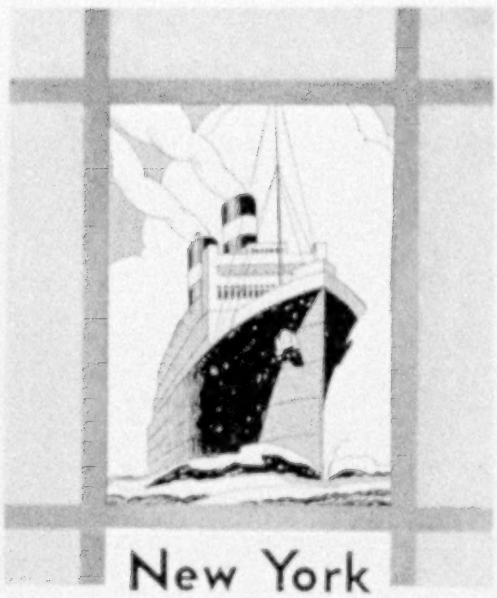

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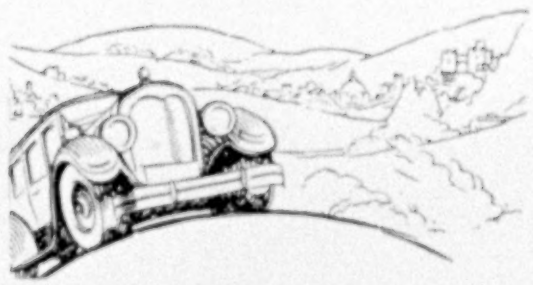

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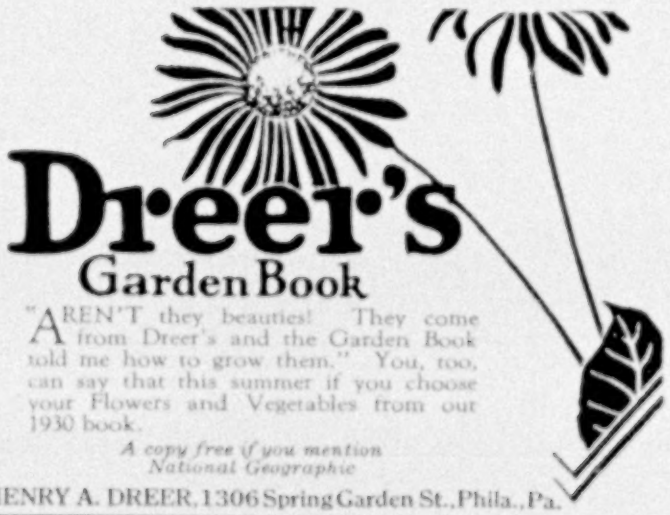

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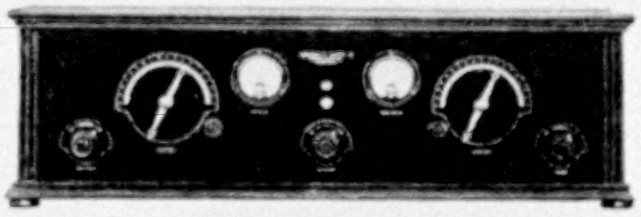

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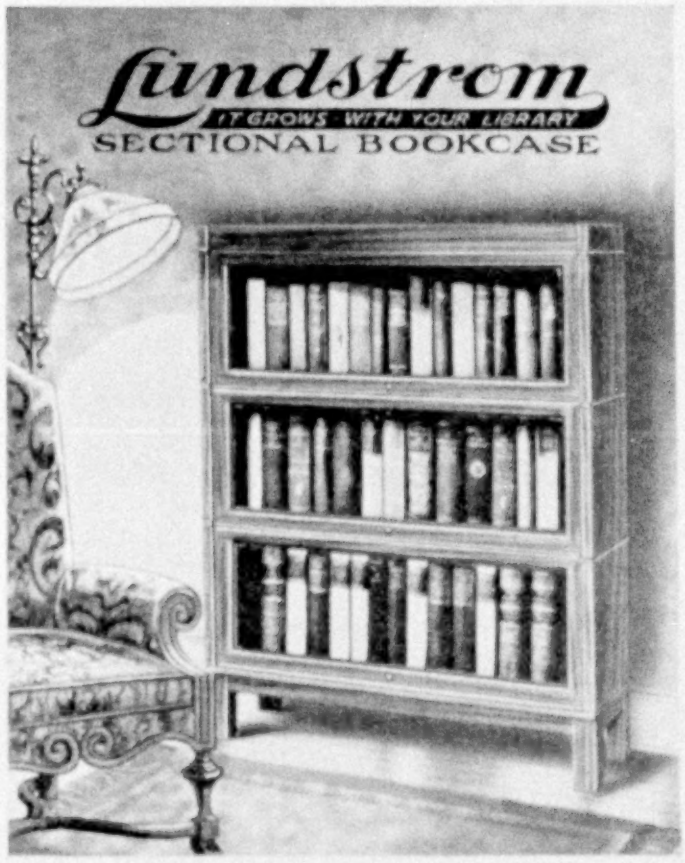

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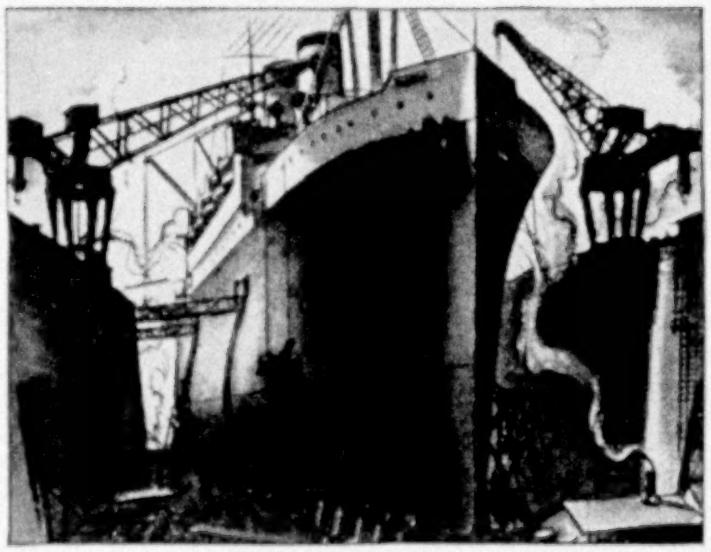

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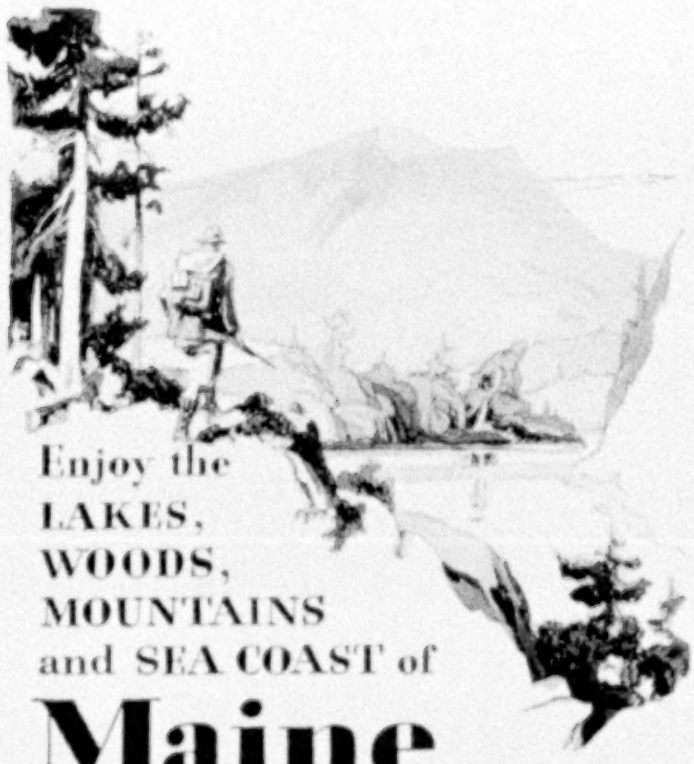

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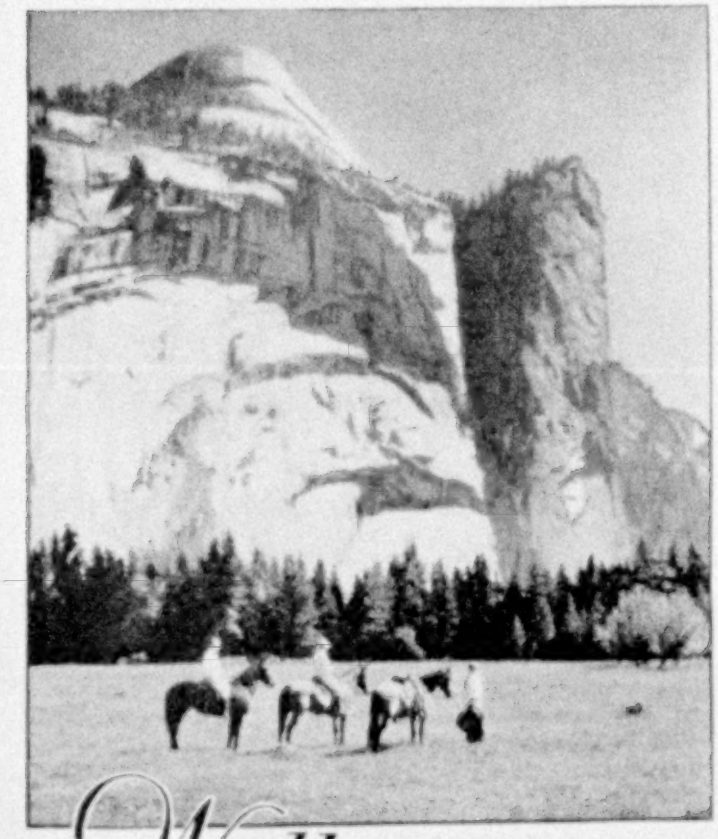

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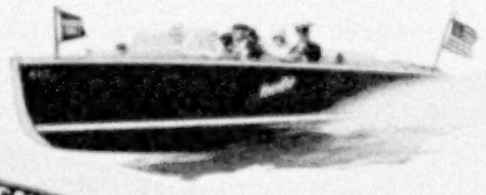

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SUMMER VACATIONS

in the Glorious Northwest

Surprisingly Moderate in Cost

14 day tour of the Glorious Northwest

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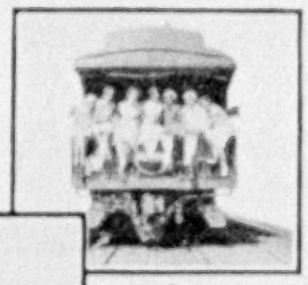

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.....193

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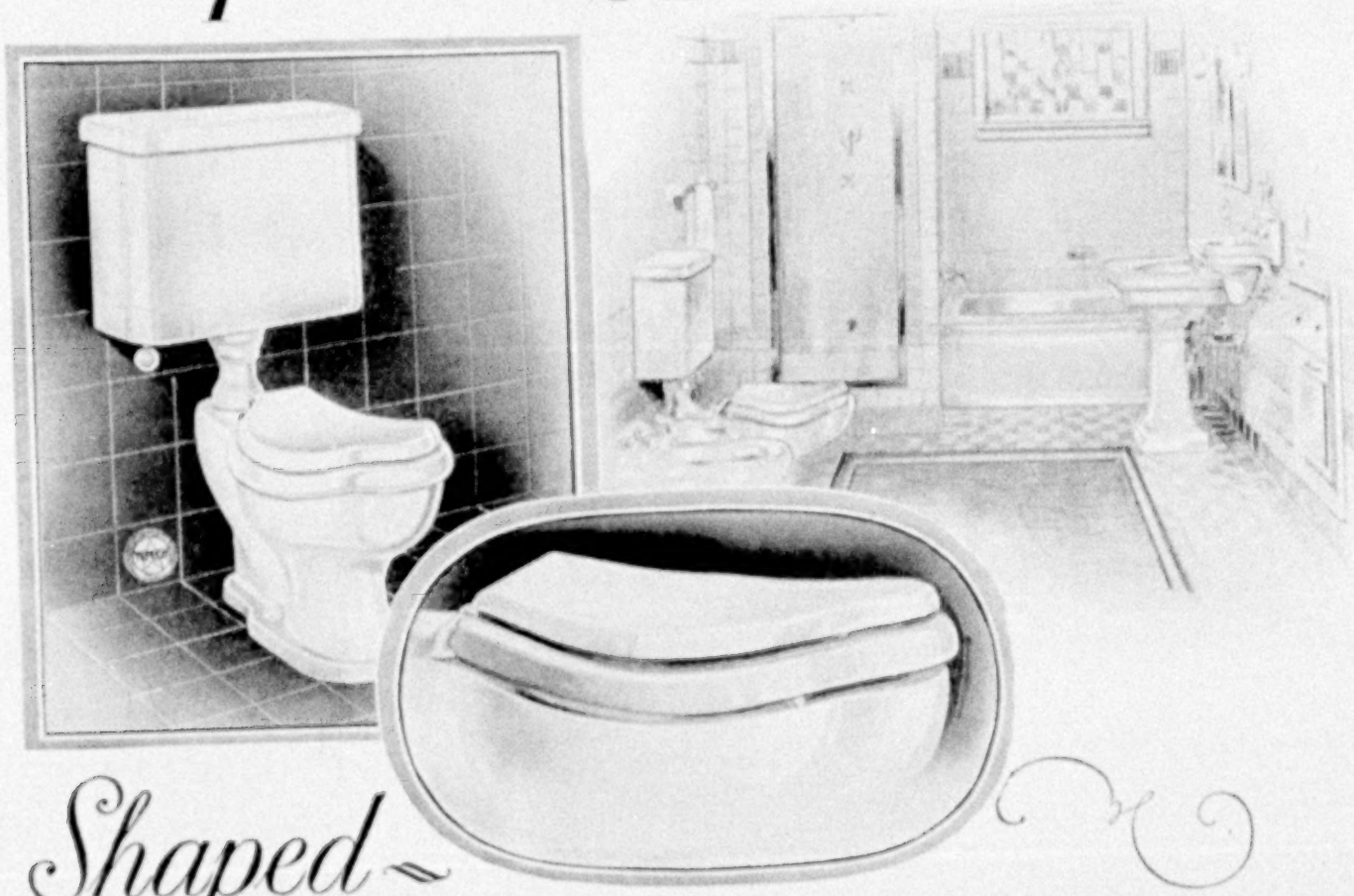
3-30

The Improved QUIET SI-WEL-CLO



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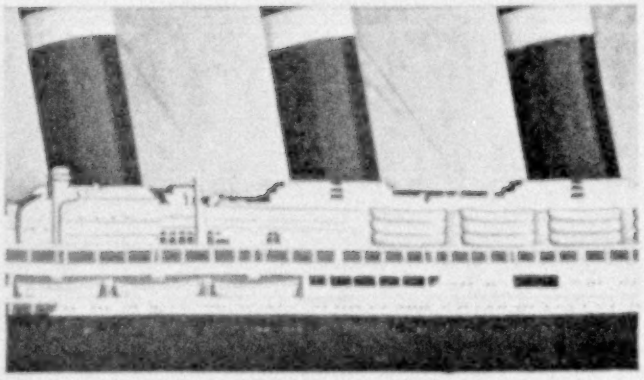

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Floor coverings can be clean from top to bottom—will be, if you clean them with a Hoover. It removes more *dirt per minute* than any other cleaner — gives faster, deeper cleaning, with less expenditure of human energy — because it gets out dirt that other cleaning methods never reach!

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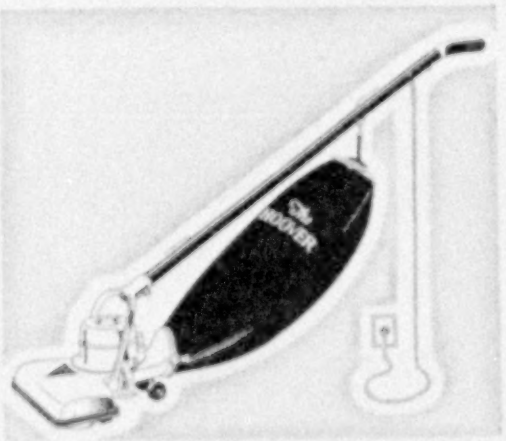
Ask your Hoover dealer for a free trial or home demonstration of The Hoover and its efficient dusting tools. Two Hoover models, only $6.25 down, balance monthly; dusting tools; liberal allowance for your old cleaner.



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IT BEATS..AS IT SWEEPS..AS IT CLEANS
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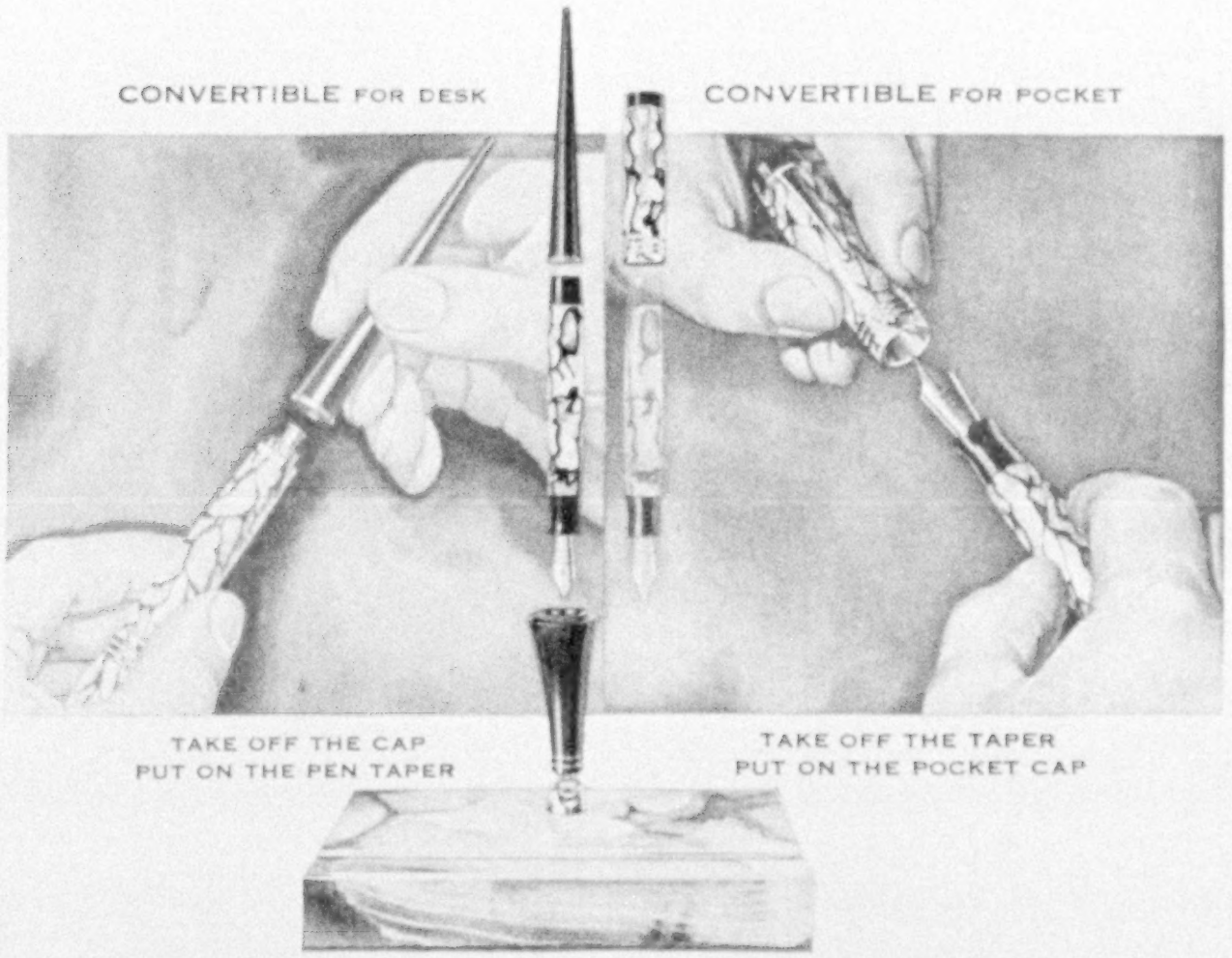

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If you buy a Parker Pocket Duofold you now can have a Desk Set without buying a second pen. Or if you buy a Parker Duofold Desk Set you also now receive a Duofold Pocket Pen guaranteed for life. Either way, you save the price of a second pen — $5, $7 or $10, according to the model.

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Parker's new streamline Duofold Pens (and Pencils to match) set *lower* in the pocket than others because the clip starts at the *top* — not halfway down the cap. This smart, balanced shape feels "at home" in the hand — and the heavy, hand-ground point writes with our famous 47th improvement—Pressureless Touch.

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